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Vol. II

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TRANSCRIPT OF RECORD

Supreme Court of the United States

OCTOBER TERM, 1938

No. 661

GENERAL ELECTRIC SUPPLY CORPORATION,
PETITIONER,

vs.

THE MAYTAG COMPANY

ON WRIT OF CERTIORARI TO THE UNITED STATES CIRCUIT COURT OF APPEALS FOR THE EIGHTH CIRCUIT

PETITION FOR CERTIORARI FILED FEBRUARY 9, 1939.

CERTIORARI GRANTED MARCH 13, 1939.

United States Circuit Court of Appeals

EIGHTH CIRCUIT.

No. 11,234

IN EQUITY.

GENERAL ELECTRIC SUPPLY CORPORATION,
APPELLANT,

vs.

THE MAYTAG COMPANY, APPELLEE.

APPEAL FROM THE DISTRICT COURT OF THE UNITED STATES FOR THE WESTERN DISTRICT OF MISSOURI.

FILED JUNE 18, 1938.

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MEMORANDUM OPINION, FINDINGS OF FACT, CONCLUSIONS OF LAW, INDICATED DECREE.

The plaintiff is the owner of Letters Patent No. 1,866,779. In its amended and substituted bill it alleges that the defendant General Electric Supply Corporation, hereinafter referred to as the defendant (a motion to quash the service of process and to dismiss having been sustained as to the General Electric Company), has infringed plaintiff's patent and particularly claims 23, 26 and 29 thereof. That one of the several defenses pleaded in the answer which, under the evidence, merits consideration, is the defense of invalidity of patent as to the claims in issue. The challenge

is that the patentee was not the original, first and sole inventor and discoverer, but that long prior to his application the patented machine and method were known and used by others in this and foreign countries. That challenge is buttressed by the decree of the United States Circuit Court of Appeals for the Second Circuit in Maytag Co. v. Brooklyn Edison Co. Inc., reported in 86 F. (2d) 625.

We realize that the District Court is but a conduit through which this case must pass on its way to an appellate tribunal, perhaps to more than one. Nevertheless, we should like to make some contribution to the final decision. Ordinarily we should hope to do that by an opinion. We are not willing, however, merely to repeat what another has said and has said better than we can say it. Judge Byers of the Eastern District of New York in Maytag Co. v. Brooklyn Edison Co. Inc. 11 F. Supp. 743 (the Circuit Court of Appeals for the Second Circuit reversed the decree entered by Judge Byers in the case cited supra), wrote an elaborate, carefully wrought, artistic (we use the word advisedly) opinion, which we can do no better than adopt. That case and the case here substantially are identical.

The Second Circuit Court of Appeals reversed the District Court for the Eastern District of New York upon the theory that plaintiff's patent had been anticipated by various inventions.

That was claimed here. The earlier contrivances, relied on by the Court of Appeals, and others, were exemplified to us by models and by actual machines. As each was operated the operation was accompanied by the testimony of a learned professor. Listening to his testimony alone (or reading it in the record), one would be forced to conclude that plaintiff's patent was an exact replica of several earlier machines. Only when the observer withdrew his gaze from the lips of the professor and observed the machines whose operation he purported to be describing did he realize that the professor's words did not accurately describe the earlier machines and their operation.

The truth is that these earlier contrivances did not work, from a practical viewpoint and certainly not in the ways disclosed in claims by Snyder. The plaintiff's machine did work, most successfully. And defendant's device is a plain infringement.

If the learned Circuit Court of Appeals for the Eighth Circuit contents itself with the printed record it is likely that it will follow the Second Circuit. If it permits the same demonstrations which we saw (and which, so it was said at the trial, the Second Circuit Court of Appeals refused to see), it may reach a different result. In the suggestion that it do that is our contribution to a just decision.

Findings of Fact and Conclusions of Law

Learned counsel for plaintiff have submitted requested

findings of fact and conclusions of law which are filed contemporaneously with this opinion and which are adopted by the Court as the Court's findings of fact and conclusions of law. The findings of fact are numbered 1 to 28, inclusive. The conclusions of law are numbered 1 to 10, inclusive.

To each of the conclusions of law adopted by the Court as the Court's conclusions of law, the defendant is allowed an exception.

The defendant has submitted to the Court requested findings of fact and conclusions of law. They are filed contemporaneously with this opinion. The requested findings of fact are from 1 to 40, inclusive. The requested conclusions of law are from 1 to 4, inclusive.

To the Court's refusal to give each conclusion of law requested by the defendant, the defendant is allowed an exception.

Indicated Decree

Counsel for plaintiff promptly will prepare and submit a form of decree in accordance with the foregoing findings of fact and conclusions of law and providing for the appointment of a master to take testimony on the subject of damages.

District Judge

Filed in the United States District Court Jan. 26, 1938.

1023 (Letter Modifying Memorandum Opinion.)

Merrill E. Otis
District Judge

United States District Court
Western District of Missouri
Kansas City

February 1, 1938

Mr. Roy P. Swanson,
Attorney at Law,
906 Commerce Building,
Kansas City, Missouri.

In re: Maytag Co. vs. General Electric Supply Corporation.

Dear Mr. Swanson:

Judge Johnson has just called my attention to a letter from Mr. Lane in which Mr. Lane says that one sentence in my opinion in the above entitled case is not entirely clear. The sentence in question is on page 3, and as written in the opinion, reads as follows: "The truth is that these earlier contrivances did not work." What I meant to say in that sentence was that the earlier contrivances did not work from a practical viewpoint and did not exemplify the claims set up in the patent in controversy. Accordingly, I have modified my opinion at this point by interlineation by adding to the sentence as herein quoted the words—"from a practical viewpoint and certainly not in the ways disclosed in claims by Snyder."

Will you do me the kindness to call Mr. Bristol's attention to this modification.

Very truly yours,

MERRILL E. OTIS.

Filed in the United States District Court Feb. 1, 1938.

1024 (Clerk's Certificate to Transcript.)

United States of America, Sct.:

I, A. L. Arnold, Clerk of the District Court of the United States for the Western District of Missouri, do hereby certify that the foregoing consisting of four volumes—Vol. I pages 1 to 146; Vol. II pages 147 to 602; Vol. III pages 603

to 1015, and Vol. IV pages 1016 to 1024—together with six volumes of exhibits, marked Exhibit Vol. I, Exhibit Vol. II, Exhibit Vol. III, Exhibit Vol. IV, Exhibit Vol. V and Exhibit Vol. VI, is a full, true and complete transcript of the record and proceedings, as called for in the praecipes filed herein and made a part hereof, in the cause wherein The Maytag Company, a corporation, is Plaintiff and General Electric Supply Corporation, a corporation, is Defendant, as fully as the same appears on file and of record in my office.

I further certify that the original Citation is prefixed hereto and returned herewith.

Witness my hand as clerk and the seal of said court. Done at office in Kansas City, Missouri, this 17th day of June, A. D. 1938.

(Seal)
U. S. Dist. Court
West. Dist. of Mo.
West. Div.

A. L. ARNOLD,
Clerk, U. S. District Court.
By H. C. Spaulding,
Deputy Clerk.

Filed Jun. 18, 1938. E. E. Koch, Clerk.

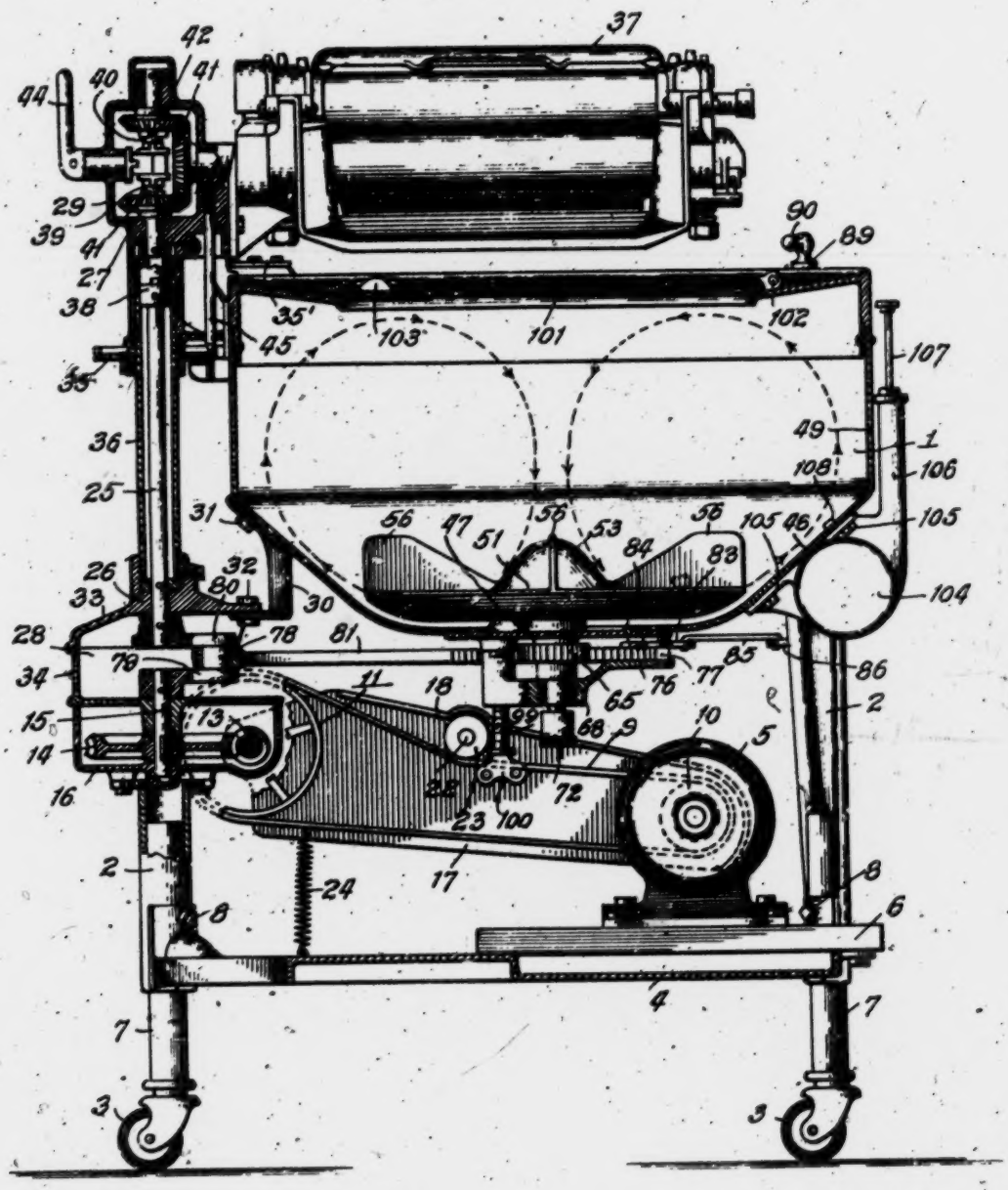
1025 (Plaintiff's Exhibit 1, Letters Patent No. 1,886,779 to H. F. Snyder, July 12, 1932.)

564 July 12, 1932. H. F. SNYDER 1,866,779

WASHING MACHINE

Filed June 14, 1922 3 Sheets-Sheet 1

Fig. 1.



Inventor:
Howard F. Snyder,
by Wallace R. Lane.
Atty.

WASHING MACHINE

Filed June 14, 1922 3 Sheets-Sheet 2

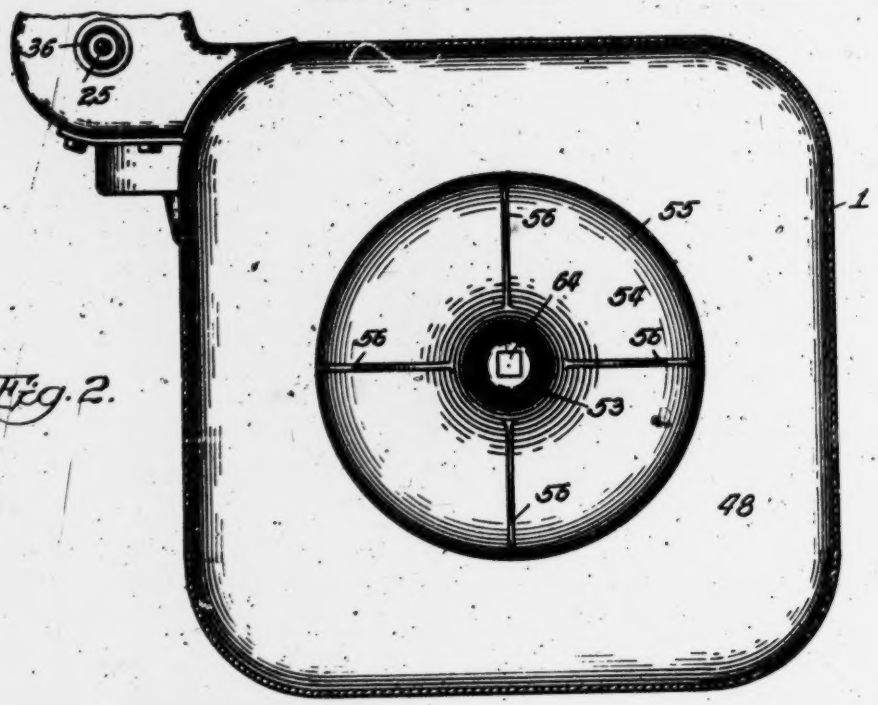


Fig. 2.

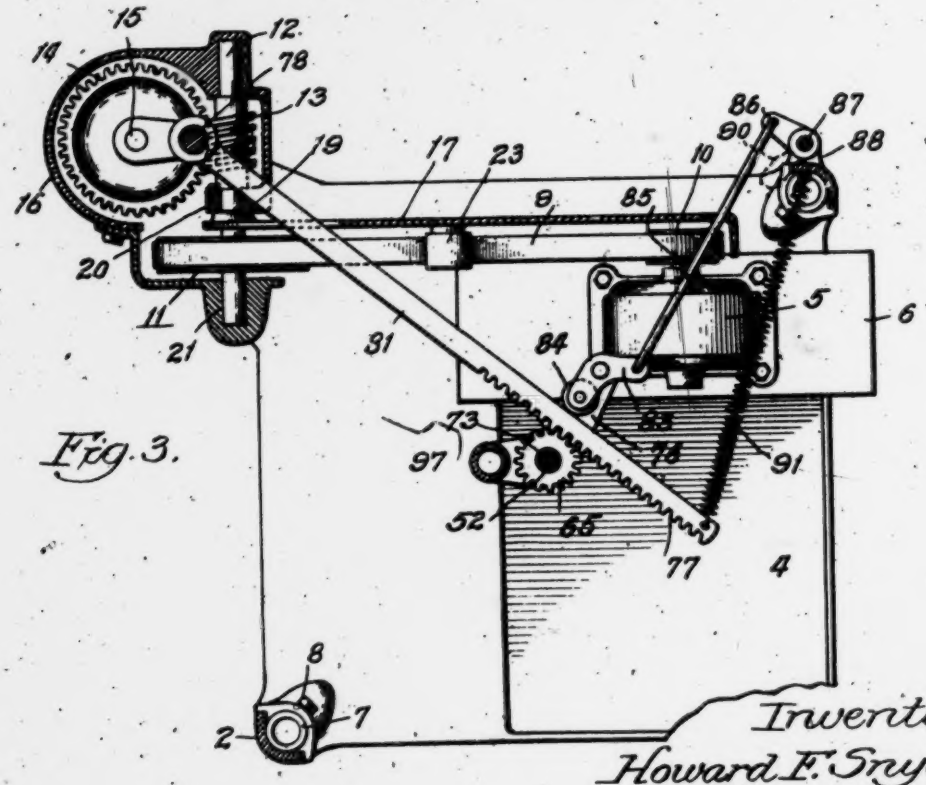


Fig. 3.

Inventor:
Howard F. Snyder,
by Wallace R. Lane
Atty.

568

July 12, 1932. H. F. SNYDER 1,866,779

WASHING MACHINE

Filed June 14, 1922 3 Sheets-Sheet 3

Fig. 4.

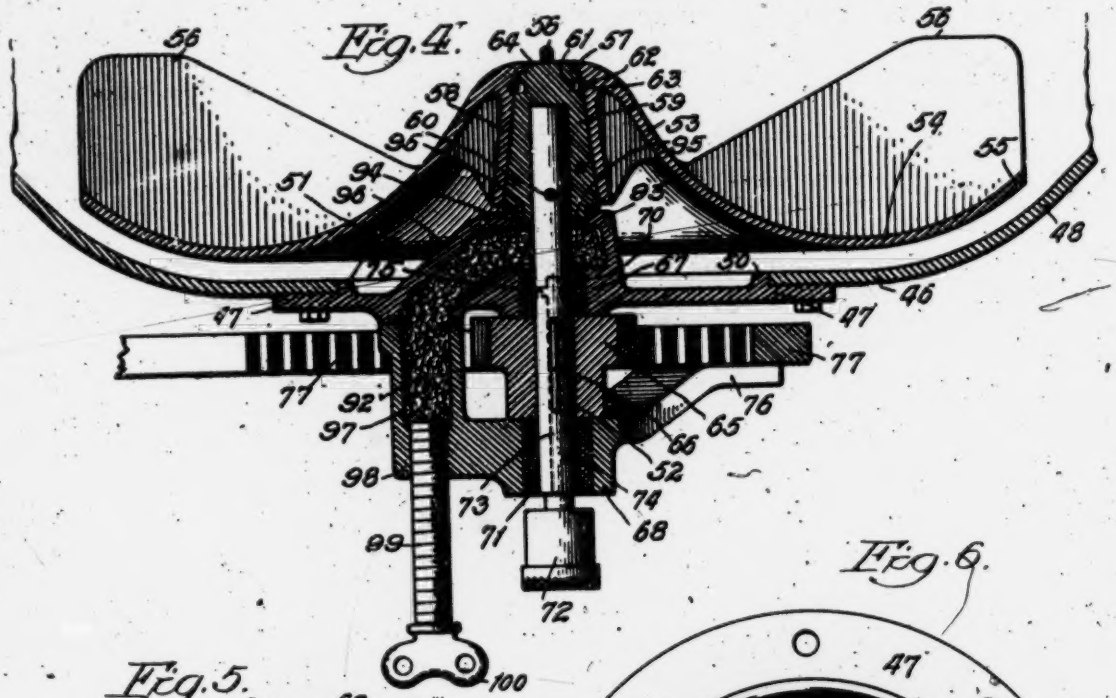


Fig. 5.

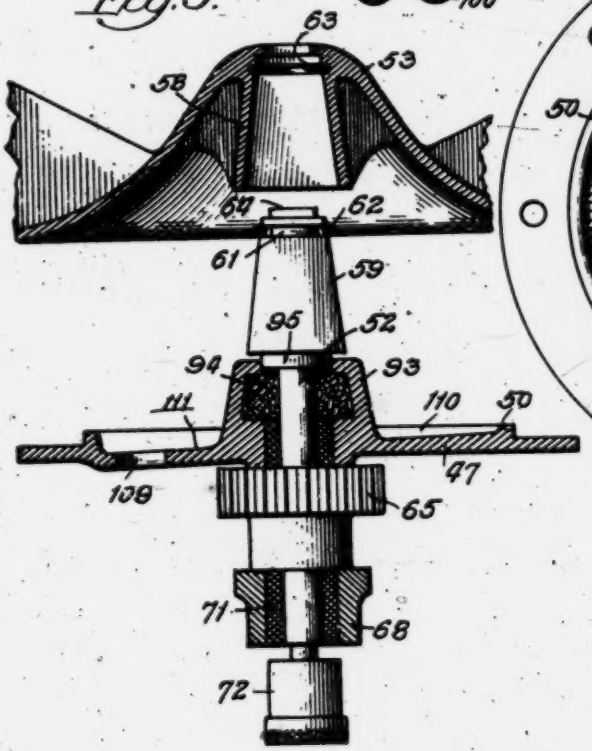
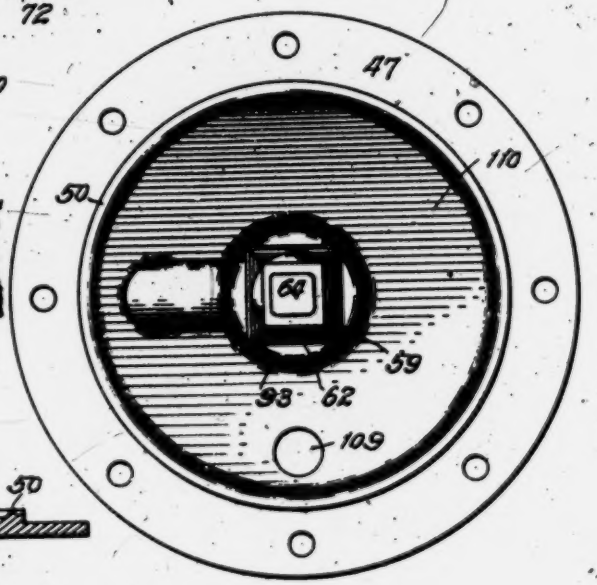


Fig. 6.



Inventor:
Howard F. Snyder.
by Wallace R. Lane.
Atty.

UNITED STATES PATENT OFFICE

HOWARD F. SNYDER, OF NEWTON, IOWA, ASSIGNOR, BY MESNE ASSIGNMENTS, TO THE MAYTAG COMPANY, OF NEWTON, IOWA, A CORPORATION OF DELAWARE

WASHING MACHINE

Application filed June 14, 1922. Serial No. 568,158.

The present invention relates to a power driven washing machine and more particularly to the construction of the gyrator or impeller and tub thereof and the gyrator or impeller operating mechanism for such machine.

Among the objects of the invention is to provide a novel construction designed to wash and thoroughly cleanse clothes, fabrics and various similar materials of all kinds. My invention is equally efficient in washing fabrics, and other similar materials of a very delicate nature, that may have become frail and weak owing to aging, wear and otherwise. Among such delicate materials are included fine laces, nettings, veils, fine silks, lace curtains and various other articles. Very often valuable articles, relics, heirlooms and other objects of great value are composed partly or wholly of fine and frail textures, such that they cannot be easily washed when soiled, since their nature would not permit subjecting them to the rigors of the ordinary washing machine operation, or even washing by hand. By my invention, the washing and cleansing of such objects is not only made possible, but practicable, such that most delicate and frail objects can be handled mechanically during the washing operation without marring their character and beauty. By reducing friction on the articles to be washed the life of the article is preserved.

These and the other objects of the invention are attained by so constructing and associating the tub and the gyrator of the washing machine, and so operating the gyrator that the weight of the articles does not interfere with the gyrator, or its action, or with the tub and its co-action with the gyrator. In my invention the gyrator and tub, irrespective of the upper or lower end position of the gyrator therein, so coact that the goods to be cleansed are not only given a definite washing and cleansing movement, but are also maintained, during such movement, in a suspended condition in the liquid, so that the rapid and energetic alternating rotary movements of the gyrator do not interfere with the goods or cause them any injury or damage, while at the same time the goods and the wash water, (or the rinse water, when rinsing), are turbulently swirled or whirled about with a surging and seething movement within the tub. Even in the form of the invention illustrated, wherein the liquid impelling blades are disposed at the bottom of the tub, the action of the agitator on the liquid is to constantly press the clothes upwardly in a swirling formation so that they are maintained in substantial suspension in the liquid above the blades. To this end the tub preferably has a smooth interior not interrupted by flanges or other projections, and preferably has an inclined bottom portion so associated with the gyrator and the remainder of the tub as to cooperate therewith in aid of such action.

One of the principal objects of this invention resides in providing this improved method of and apparatus for cleansing fabrics without bringing them into substantial rubbing contact with the walls of the tub or the liquid agitating mechanism.

As another object of the invention, the gyrator is provided with flanges which, during the alternations thereof, act to successively impart movement to the contents of the tub, such that the resultant direction of movement of the contents in the embodiment illustrated in the drawings is normally radially outward from the central portion of the tub, then upwardly, then inwardly and then downwardly toward the center of the gyrator, and yet at the same time there is a generally rotary progression or movement about the inside of the tub, first in one direction and then in an opposite direction, such movement being in the nature of a gyratory action or movement and appearing to be that of a helix around a ring. In this way the goods or objects undergoing the washing operation are driven about in the tub in devious paths, while at the same time the wash water or cleansing fluid is being vigorously agitated and rigorously moved about the tub in devious paths to sustain the washable materials, whereby they will not be injuriously affected by the gyrator operating or actuating mechanism. This mechanism may be

readily thrown into and out of operative connection with the gyrator at will.

Still further objects of this invention reside in providing a novel construction of agitator blade; and in further providing resilient means, tending to normally render the gyrator inoperative but yieldable to render the same operative when manually actuated; to provide a combined means for guarding against the accidental contact or interference of the operator with the driving mechanism of the washing machine and maintaining the driving mechanism in effective driving condition, as by constantly maintaining a driving belt taut; and to provide other features having the objects, advantages and capabilities hereafter more fully appearing.

Due to the construction and arrangement of the tub, gyrator and driving mechanism, this machine provides a decidedly new method of cleaning fabrics, in that while the clothes are washed thoroughly, this is done by the action of the water itself on the materials as distinguished from their being rubbed or drawn through the water by a dolly or other mechanism, or tumbled against the sides of the tub or rubbed against projections on the interior of the tub. In my machine the clothes are driven and swirled about in and by the water in the interior of the smooth tub. The materials never come in any substantial contact with either the tub, or the gyrator which initially causes the agitation, seething and surging of the water on the interior of the tub. The peculiar movement of the water caused by the action of my gyrator in operation largely prevents rubbing the clothes against the container or gyrator and eliminates the deterioration of the materials being washed by it. These and other advantages which I find it difficult to explain because of the unusual movement of the water are possessed by my machine.

By the term gyrator is meant an alternating rotary member operable to effect movements of fluids and materials from the central portion of the member toward its outer edge or borders.

In the drawings illustrating a preferred form of the invention:—

Fig. 1 is a vertical sectional view taken through the washing machine.

Fig. 2 is a horizontal sectional view taken through the tub, showing the gyrator in top plan view.

Fig. 3 is a sectional view showing portions of the operating mechanism.

Fig. 4 is a detail vertical sectional view on an enlarged scale of the bottom of the tub, the gyrator, part of the gyrator operating mechanism and the packing means for the bearing of the gyrator shaft.

Fig. 5 is a detailed sectional view of the driving connection between the gyrator and the driving mechanism therefor.

Fig. 6 is a top plan view of the removable plate at the bottom of the tub, with the gyrator removed.

Referring more particularly to the drawings the washing machine comprises a tub 1 supported upon and fastened to legs 2 having roller casters 3. To the legs 2 is secured a platform 4 upon which is supported a motor 5 bolted to an insulating base piece 6 in turn bolted to the platform 4. The legs 2 have telescopic sections 7 of tubular form slidable in clamp portions, forming part of the legs 2, for the purpose of adjusting the height of the washing machine, the sections 7 being held in adjusted position by means of set screws 8. The motor 5 is connected to the driving mechanism by means of a belt 9 running over a pulley 10 fixed to the motor shaft and a driven pulley 11 fastened to a cross shaft 12 carrying a worm screw 13 in mesh with a worm gear 14 keyed to a vertical shaft 15. The gear mechanism 13–14 is suitably housed in a housing 16 bolted to and forming part of one of the supporting legs of the washing machine.

Between the motor 5 and the gear mechanism 13–14 extends an aluminum belt guard 17 which encases the belt 9 and pulleys 10 and 11, the guard having a flange 18 extending over the upper lap of the belt and the pulley 10. By this means accidental contact with the driving belt 9 and pulleys 10 and 11 is prevented. The guard has a hub portion 19 by which it is pivotally supported upon a part of the shaft 12 between the bearings 20 and 21 formed in the housing 16. To an intermediate part of the guard is fastened a pivot stud 22 upon which is idly and rotatably carried a belt tightener roller 23. It will be noted that this guard is supported only by the shaft 12 and the roller 23 bearing upon the upper lap of the belt 9, so that the guard is capable of an upward and downward swinging movement about the axis of the shaft 12 as the belt becomes taut or slack. The amount of the tautness given the belt, as the roller 23 presses against it, is derived from the combined weight of the guard, with the parts carried by it, and a tension spring 24 connected between and to the guard 17 and the platform 4, the tension of the spring adding to the weight of the guard to maintain the roller 23 in tightening contact with the belt.

In vertical alinement with the shaft 15 is a second shaft 25, rotatably supported in suitable bearings 26 and 27 respectively, forming parts of the crank and gear housings 28 and 29. Said housing 28 is rigidly connected to the tub by means of a bracket 30 and bolts 31 and 32 and includes the top and intermediate members 33 and 34 of the housing 16. The housing 29 is rotatably sup-

ported upon a ledge 35 rigidly bolted to the side of the tub 1 and also made fast to the top of the tub through a bolted bracket 35'. A tube 36 is connected between the members 33 and 29 and houses the shaft 25. The shaft 25 drives a wringer 37 through the medium of clutches 38, 39 and 40, and gears 41, 42 and 43, which may be manually and selectively controlled through the handle 44 for causing the operating of the wringer in any direction desired and in whatever position the wringer may be relative to the tub. The wringer is capable of swinging into different positions with respect to the tub about the axis of the shaft 25, and to be held in any of its positions by a spring pressed locking pin 45 cooperative with recesses in the ledge 35. The details of the mechanism for operating the wringer do not form part of this invention, and therefore, further description thereof is deemed unnecessary.

The tub 1 is preferably substantially square in horizontal cross-section and is shallow with respect to its horizontal dimensions. It has a central bottom portion 46, an inclined portion 48 and vertical side walls 49. It may, however, be of other form than square and the inclined portion 48 may be omitted.

For the purposes of exemplifying my invention, the gyrator or impeller is disclosed and described as mounted on the tub for support. Herein it is shown as projecting upwardly through the bottom of the tub, but it must be evident that all desirable arrangements are within the contemplation of this invention, such, for instance, as the mounting of the impeller so as to depend into the liquid from the upper portion of the tub, thereby bringing about the consequent reversal in the flow of the fluid through the tub. Thus, as modified, the flow will be radially outwardly and thence downwardly, and then inwardly and upwardly toward the center of the gyrator. In the present disclosure the bottom 46 of the tub 1 has a circular opening which is normally closed by a plate 47 bolted to the bottom 46. The radially extending portion 48 at the bottom 46 inclines upwardly toward the vertical side of walls 49 of the tub for a purpose hereafter described. The plate 47 supports the gyrator 51, the packing means for the gyrator shaft 52 and part of the operating mechanism for the gyrator.

The gyrator is metal, or other suitable material, and is of generally circular form when viewed in plan. It comprises an annular, trough-like or dish-shaped portion 54, the central or inner portion of which merges in a continuous concave curve into a central upstanding stem portion 53 which tapers upwardly and terminates in an upper rounded end. The outer peripheral edge of the trough-like portion 54 extends outwardly and upwardly in a concave curve 55 which is continuous with the dished curve of the portion 54. The gyrator is provided with liquid impelling means, one form and arrangement of which is illustrated in the drawings.

Extending in spaced position radially from the central stem or dome 53 are a plurality of flat, vertically projecting blades, wings or flanges 56 of the shape shown in Fig. 4 of the drawings. The projecting surfaces of these blades taper or incline inwardly in a general direction from their outer edges to the trough-like portion of the gyrator. They extend from the outer edge of the upwardly inclined portion 55, across the portion 54, thereof, and thence upwardly vertically along the sides of the central upstanding stem 53 to a point approximately half way up the sides thereof. At this point the blades merge into the upper rounded end of the stem. The remaining or upper part of the stem is free of blades and forms a smooth, continuously flowing curve at the apex 57.

These blades 56 are of substantial height at their outer portions, so as to project well into the cleaning fluid. The blades incline or curve downwardly and inwardly toward the central axis of the agitator, that is, to the sides of the stem where they merge into the stem. As shown in Fig. 4, the blades extend across the dish-shaped member at the lower ends in lobe-shaped form and the upper surfaces of the wings or blades extend considerably above the dish-shaped member to provide sufficient blade surface to impart a considerable force or throw to the water in the direction outwardly and somewhat parallel to the axis of rotation of the gyrator, as hereinbefore described. It is to be noted that the outer inclined portion 55 of the dish-shaped member assists in this movement and that this directional flow is augmented by the inclined walls 48 of the surrounding trough or tub. The force imparted to the water is sufficient to cause the water to flow upwardly toward the top of the tub, as shown in dotted lines, Fig. 1. The downward flow at the upper central portion of the tub prevents the overflow of suds. In the embodiment shown there are four of these blades, but any other number may be used as desired. Within the central stem portion 53 and depending from the apex 57 thereof is a hollow pyramidal socket 58, preferably square in horizontal section. It is adapted to fit upon a square pyramidal block or step 59 socketed to fit upon the upper end of the shaft 52 and secured to said shaft, to positively rotate therewith, by a cross pin 60 extending transversely through the shaft. At the upper end portion of the step 59 is formed an annular groove 61 in which reposes a spring lock-ring 62 adapted, when the gyrator is forceably moved downwardly upon the step 59, to expand into an annular groove 63 formed in the apex portion 57 of

the gyrator. The uppermost end 64 of the step is squared to fit into a like aperture formed into the apex 57. The lower end of the socket may be provided with notches into which the ends of the cross pin 60 may extend, if desired. The various gyrator portions, namely, the apex, trough, peripheral, blade and pyramidal portions all are preferably integral. While this embodiment illustrates the invention, it is to be understood that the gyrator may be located at the top of the tub and in depending position from the top or cover thereof.

The shaft 52 is fixed to a pinion 65 by means of a key 66, and has bearings 67 and 68 respectively formed in the plate 47 and in a bracket 69 bolted to the underside of the plate 47. These bearings have bushings 70 and 71, preferably of brass or bronze. The pinion 65 is in thrust bearing with the ends of the bearings 67 and 68, and clamping bolts hold the bracket 69 in place such that the pinion 65 has no loose play, yet it is permitted to freely rotate or oscillate. The lower end of the shaft 52 has a grease cup 72 operative to supply a lubricant through bores 73, 74 and 75 to the bearing surface between the shaft 52 and bushings 70 and 71. The bracket has an arm 76 upon which rests and freely slides reciprocating rack 77 adapted to mesh with the drive pinion 65, the other end or crank arm portion 81 of the rack being pivotally connected to a crank pin 78 fixed to crank arms 79 and 80 fastened to the ends of the shafts 15 and 25.

The rack 77 may be thrown into or out of operative engagement or mesh with the pinion 65 at will. This is accomplished by the mechanism shown in Fig. 3. Upon the end of the arm 76 is pivotally supported a bell crank lever 83 carrying at one of its ends a roller 84 bearing against the rear face of the rack 77 and being apertured at its other end to receive a bent end of a link 85 running to a crank arm 86 having its free end also apertured to receive the other bent end of the link, the link being thus pivotally connected to said lever 83 and arm 86. The arm is fast to a vertical shaft 87 rotatably supported in bearings 88 and 89 respectively rigidly secured to a leg 2 and the side of the tub 1 (see Figs. 3 and 1). To the upper end of the shaft is fastened a handle 90 by which the lever 83, through the media of link 85, arm 86 and shaft 87 may be forced against the rack to cause the latter to engage with the pinion 65. A spring 91 is connected to the end of the rack 77 and a fixed part of the washer, as a leg 2 thereof, for the purpose of automatically disengaging the rack from the pinion and to hold the rack away from the pinion when the handle 90 is shifted to throw the lever 83 out of operation and thus stop the oscillation or rotation of the gyrator. The spring constantly tends to hold the rack away from the pinion and against the roller 84, the rack being thrown into mesh with the pinion only when the lever 83 and roller 84 are moved to positively shift the rack into enmeshment. The rotation of the crank 79–80 will cause a reciprocation of the rack over the arm 76 whether or not the rack be in engagement with the pinion. When the rack is moved into mesh with the pinion, the later is caused to alternately rotate and through the medium of shaft 52 impart such movement to the gyrator in the tub.

For the purpose of packing the gyrator shaft 52 the plate 47 and the bracket 69 are provided with communicating chambers adapted to hold a packing material 92, preferably composed of chopped or shredded and comminuted asbestos, graphite and oil. The packing space comprises an annular chamber 93 surrounding the shaft 52 between the bearing 67 and bushing 70, and a washer or packing 94, preferably of leather, in the opening at the top of the chamber 93 and located between the bottom end 95 of the step 59 and the packing material in the chamber 93. The chamber 93 extends through a passage 96 to a plunger chamber 97. The lower portion 98 of the latter has a screw threaded aperture in which operates a screw plunger 99 having at its outer end a winged finger piece 100 which may be manually rotated to feed the plunger into the chamber 97 against the packing 92. The packing 92 is somewhat plastic and is in a sort of fluidal state so that the stress applied to it by the forceful entry of the screw plunger into the chamber 97 will cause the packing 92 to flow through the passage 96 to the chamber 93 and completely fill the space of the latter. In this way compensation for any loss of packing owing to wear, leakage and otherwise is readily made. Leakage of wash water or cleansing fluid from the tub around the shaft 52 is prevented by this novel packing means.

The open top of the tub is normally closed by a cover 101 having a hinge 102 at one side and a finger grip piece 103 at the other side.

At one side of the tub is secured a liquid soap dispenser comprising a reservoir 104 fastened to the wall 48 by bolts 105 and adapted to contain a relatively large supply of soap. To this chamber is connected a measuring pump 106 into the upper portion of which a charge of fluid soap is drawn by the piston on piston rod 107, and upon a downward movement of the piston and rod, discharged into the tub through a discharge tube or nozzle 108 so located that the ejected charge will be in the general direction of the movement of the mass of material and cleansing solution within the tub during the washing operation.

When the gyrator is alternately rotated or oscillated, with materials to be cleansed and the cleansing liquid in the tub, the liquid is given a radially outward and upward movement toward the upper part of the tub, then an inward movement, then a downward movement toward the cone 53 of the gyrator, the liquid also progressing, in its whirling action, about the tub first in one direction and then in an opposite direction so that the resultant motions are substantially gyratory ones, as helical movements about a ring having a circular cross-section. In this way the washing and washable materials are given a turbulent swirling action. As a result of this action imparted to the cleansing liquid by the gyrator, the water in turn imparts a similar action to the fabrics. Goods are thus whipped, whirled and dashed around in the sieving, whirling, turbulent action set up by the gyrator. Thus the fabrics are given a quick, snappy, sieving, whirling, reversing double action, produced by the gyrator, doubling the clothes first one way and then the other until every thread in the fabric is acted upon an untold number of times, somewhat like the cracking of a whip-lash in all directions. While it is very difficult to describe the action of the water and the movement of the clothes therein produced by the rapid reciprocation of the gyrator or impeller in the container, whereby the materials are thoroughly cleansed while held in suspension by the peculiar and novel movement and action of the water, I believe that the foregoing description will easily enable anyone skilled in the art to readily construct and operate my invention and fully utilize the herein disclosed method. At or before the start of the operation, and during the operation of the machine, as desired, charges of liquid soap may be ejected into the moving mass in the tub.

The plate 47 has a drain port 109 with which may be connected a hose normally supported at its free end at one side of the machine but which may be lowered to drain the tub of its contents. The plate 47 is formed with a shallow depression 110 surrounded by the flange 50 and having an inclined bottom 111 extended from one side to the other of the shaft 52 and chamber 93, in order to permit efficient drainage of the fluids in the tub through drain port 109.

It is of course understood that the specific description of structure set forth above may be departed from without departing from the spirit of my invention as set forth in this specification and the appended claims.

Having now described my invention, I claim:

1. The method of cleansing fabrics in a tub consisting in agitating a washing fluid in such a way as to create positively driven violently flowing currents moving away from and back to the plane of the source of agitation, and also around the tub in one direction in a plane approximately parallel with the plane of agitation, and then causing it to move away from and back to the plane of the source of agitation and in a reverse direction in a plane approximately parallel with the plane of agitation so as to bodily and forcibly cause the fabrics in the tub to travel in substantially the same paths as the fluid, whereby thorough cleansing of the fabric is effected without substantial contact with rubbing surfaces.

2. A washing machine comprising in combination, a container having a substantially uninterrupted inner surface, a rotary reciprocatory disk-like impeller near the bottom of the container having upstanding flanges thereon so arranged as to violently force water in the container laterally and upwardly in one gyratory direction and then laterally and upwardly in an opposed direction, whereby the materials being washed will be substantially suspended by the water and thoroughly cleaned while thus suspended, and motor-driven means extending through the bottom of the container to rotatably reciprocate the impeller.

3. A washing machine comprising in combination, a container having a substantially uninterrupted inner surface, a rotary reciprocatory disk-like impeller mounted adjacent the bottom of the container, so constructed and arranged that when water and materials to be cleaned are placed in the container and the impeller is reciprocated, the water will first be violently forced laterally and upwardly in one gyratory direction and then laterally and upwardly in an opposed gyratory direction, so that the materials being cleaned will be suspended by the movement of the water, and the water forced through and around the materials to thoroughly cleanse them, while said materials are substantially out of rubbing contact with the mechanical parts of the machine, and motor-driven means for rapidly driving the impeller.

4. In a washing machine the combination of a tub for containing a cleansing substance and the materials to be cleansed, said tub having an outwardly and upwardly inclined portion, an impeller cooperating with the said inclined portion of the tub to force said cleansing substance and materials to be cleansed outwardly in a direction substantially parallel with said inclined portion, and power means for oscillating said impeller.

5. In a washing machine the combination of a tub adapted to contain wash water and goods to be washed, said tub having a flared portion, a liquid impeller in said tub, having a depressed portion, said liquid impeller cooperating with said flared portion to swirl said wash water and goods with a substan-

tially gyratory movement, and power means to alternately rotate said liquid impeller.

6. In a washing machine comprising driving power means, the combination of a tub for containing a cleansing substance and materials to be cleansed, a liquid impeller mechanism driven by said power means for oscillating said liquid impeller, said liquid impeller having flanges and a radially depressed portion operative to upwardly swirl said cleansing substance and material.

7. In a washing machine comprising a driving power means, the combination of a tub for containing washing and washable materials, a liquid impeller, means operable to alternately rotate said liquid impeller, said liquid impeller being provided with upstanding flanges and a depressed portion on each side of each of said flanges and operative to swirl said materials with a substantially gyratory movement.

8. In a washing machine comprising driving power means, the combination of a tub for containing a cleansing substance and materials to be cleansed, a liquid impeller, mechanism driven by said power means for alternately rotating said liquid impeller, said liquid impeller having upwardly and radially extending flanges and a radially depressed surface operative to upwardly swirl said cleansing substance and materials.

9. In a washing machine comprising driving power means, the combination of a tub adapted to contain washing and washable materials, a liquid impeller in said tub and operated by said means, said liquid impeller having a centrally raised portion and radially depressed portion, and operable to swirl said materials with a substantially gyratory movement.

10. In a washing machine having driving power means, the combination of a tub adapted to contain washing and washable materials, a liquid impeller in said tub and operated by said means, said liquid impeller having a centrally raised portion, a radially depressed portion and flanges extending radially from said centrally raised portion, said liquid impeller operable to swirl said materials with a substantially gyratory movement in said tub.

11. In a washing machine having driving power means, the combination of a tub adapted to contain washing and washable materials, a liquid impeller in said tub and operated by said means, said liquid impeller having a central conodial portion, an inclined peripheral portion and an intermediate trough portion, said liquid impeller operating to swirl said materials with a substantially gyratory movement in said tub.

12. In a washing machine comprising driving power means, the combination of a tub for holding a cleansing fluid and materials to be cleansed, a drain plate at the bottom of said tub and having a sloping bottom portion extending from one side to the other of the center of said tub, and an eccentrically located drainage connection attached to said inclined portion, a shaft extending through said plate and a liquid impeller on said shaft for giving said substance and material turbulent motion.

13. In a washing machine comprising a driving power means, a tub, an alternating rotary liquid impeller having a plate formed with an annular depression, a raised central portion and upstanding flanges in said depression, said plate, depression, central portion and flanges operating on the contents of the tub to give the contents a gyratory movement.

14. An agitating member for a washing machine comprising a cup-shaped disk having a frusto-conical portion rising from the center thereof, the vertical elements of which are concave so that the surface of said portion merges into the surface of said disk, and a round upwardly tapering portion projecting above said frusto-conical portion and terminating in a rounded surface, and narrow radial wings projecting from said latter portion and extending along the sides thereof and across the surface of said disk and having rounded outer edges merging into the concave surface of said disk.

15. An impeller for a washing machine comprising an annular trough, a stem rising centrally from said trough and having a plurality of circumferentially spaced radial wings projecting therefrom and extending along its sides and across the surface of said trough, the top surface of said wings above said trough curving downwardly and inwardly.

16. A rotatable impeller for a washing machine adapted to be disposed in a liquid containing receptacle comprising a dish-shaped member having a central upstanding tapered stem with a rounded upper end, ribs extending across said dish and upwardly along the side of said stem and having rounded upper edges merging into the rounded surface of said stem.

17. In a washing machine, a tub for containing wash water and goods to be washed, an oscillatory disk-like agitator in said tub near the bottom thereof and having a plurality of upstanding water-impelling projections extending from one face thereof, said projections being of substantial height contiguous to the periphery of the agitator and decreasing in height toward the center whereby side faces of substantial area are provided, and while the agitator is oscillated the water and goods will be vigorously forced laterally upwardly in gyratory paths to violently force the water through, between and around the goods and thoroughly cleanse them while

they are sustained in the water free from any substantial contact with rubbing surfaces, and motor-driven means for oscillating the agitator.

18. In a washing machine an agitator and power means for imparting alternate rotative movement thereto, said agitator consisting of a substantially disk-like imperforate body and a plurality of liquid impelling projections extending from one face thereof, said projections being of a maximum depth contiguous to the periphery of said body and having their free edges inclined inwardly to the center of the agitator, leaving the central portion of said body free of water impelling projections.

19. In a washing machine, a tub having side walls and a bottom, a driving shaft extending through said bottom into the tub, an agitator fixed to said shaft to oscillate therewith, power means for oscillating said shaft and agitator, said agitator comprising a substantially circular base having an upstanding central portion, blades extending upwardly from the upper face of said base, the blades being of greatest height adjacent the marginal edge of the base, decreasing in height toward the center and merging into said upstanding central portion, the union between the agitator and the shaft permitting removal of the former from the latter by an upward movement, the oscillation of the agitator causing the blades to set up violent movements of the fluid and tub contents outwardly away from the agitator, upwardly, inwardly and then back toward the agitator, there also being superposed on this circulatory movement a movement of the fluid and tub contents first in one direction circumferentially of the tub and then in the other, so that the articles being washed will be thoroughly cleansed without any material rubbing of the blades thereagainst.

20. In a washing machine, a tub, a driving shaft extending into the tub, an agitator secured to said shaft to oscillate therewith, power means for oscillating said shaft and agitator, said agitator comprising a substantially circular body portion having blades extending therefrom on the face presented to the material being washed, the blades adjacent the marginal edge of the body portion being of a substantial dimension in a direction at right angles to the body portion, said body portion being free of any holes or openings of substantial dimensions, said blades and adjacent portions of the body portion of the agitator when the agitator is oscillated throwing the fluid in the tub, and material being washed, violently outwardly from the edge of the agitator whereby it will flow in circulatory paths away from the agitator, along the sides of the tub, then inwardly and back toward the agitator, this cycle being continuously repeated.

21. In a washing machine, a tub having a substantially uninterrupted inner surface and adapted to contain cleansing liquid and materials to be washed, the bottom of the tub merging smoothly into the sides, an oscillatory liquid impeller mounted adjacent the bottom of the tub, having on its upper surface upstanding wing-like means of substantial height and length so constructed and arranged that when the impeller is given a rapid rotary oscillatory movement the cleansing liquid and materials to be washed will be violently forced laterally from the impeller then upwardly along the side of the tub, then away from the tub side and back toward the impeller, this cycle being continuously repeated to force the cleansing liquid through and around the materials to be washed to thoroughly cleanse them while they are substantially out of rubbing contact with the impeller, and motor-driven means for imparting to said impeller a rapid rotary oscillatory movement.

22. A washing machine comprising in combination, a tub for containing cleansing liquid and materials to be cleansed, said tub having a bottom portion, and an upwardly extending wall portion the interior surface of which is free from rubbing projections, the juncture of the bottom portion with the upwardly extending portion being inclined to facilitate the movement of currents outwardly and upwardly and along the interior surface of the tub, a rotary reciprocatory impeller mounted in the tub adjacent its bottom, the upper surface area of which is considerably less than the horizontal cross-sectional area of the tub through its upwardly extending portion, the margin of said impeller being spaced a substantial distance away from the upwardly extending portion of the tub, a rotary reciprocatory drive shaft extending upwardly through the bottom of the tub into the interior thereof, the impeller being mounted upon said shaft for movement therewith in a fixed plane, said impeller having on its upper surface a plurality of upstanding wing-like blades, each of which is of substantial height and length, and provided with lateral impelling faces of substantial area, the impeller and tub being so constructed and arranged relative to each other as to cooperate while the impeller is reciprocated for whipping the fluid and violently forcing it first in one and then in an oppositely upward circulatory direction against the interior of the tub and through and around the materials being washed, and substantially suspending the materials in the fluid by the moving fluid, and means for imparting a rapid rotary reciprocatory motion to the said shaft and impeller.

23. A washing machine comprising in combination, a tub for containing cleansing liquid and materials to be cleansed, said tub hav-

ing a bottom portion and an upwardly extending wall portion, the interior surface of which is free from rubbing projections, a rotary reciprocatory impeller mounted in the tub adjacent its bottom, having a base and a plurality of blades, each of which is of substantial height and lateral area, and a central portion projecting upwardly from the base, the upper surface area of the base being considerably less than the horizontal cross-sectional area of the tub through its upwardly extending portion, the margin of said base being spaced a substantial distance away from the upwardly extending portion of the tub, said tub and impeller being so constructed and positioned relative to each other that when the impeller is rapidly reciprocated each blade and its adjacent portion of the impeller base will simultaneously drive the cleansing fluid in one and then an opposite outward upward circulatory direction toward and around the clothes, and act in cooperation with the interior of the tub to cause violently flowing opposed currents of liquid to meet and flow inwardly and downwardly toward the central portion of the tub, and substantially suspend the materials in the fluid while being washed, a rotary reciprocating drive shaft extending upwardly through the bottom of the tub into the interior thereof for supporting the impeller for movement in a fixed plane, and power means for rapidly reciprocating the shaft and impeller for the purposes set forth.

24. In a washing machine, a tub adapted to contain a washing fluid and materials to be cleansed, a rotatively reciprocatory driving shaft extending through the bottom of the tub at the center thereof, a liquid impeller mounted on said shaft near the bottom of the tub, the outer portion of the impeller being spaced a considerable distance from the interior side surface of the tub and rotatively reciprocatory with the shaft, said impeller comprising a base, a central portion projecting upwardly therefrom and a plurality of uniform blades projecting upwardly from the base and equally spaced and extended radially from the central portion, each blade being of greater area at a position contiguous to the edge of the base than at the center thereof, and means for imparting rotary reciprocatory motion to said shaft and the impeller mounted thereon, the impeller and the tub being so constructed and relatively positioned as to cooperate while the impeller is reciprocated to cause the liquid to be violently forced laterally and upwardly against and in one direction, circumferentially around the inner surface of the tub, and laterally and upwardly against and in an opposite direction, circumferentially around the inner surface of the tub whereby the materials will be thoroughly cleansed while substantially suspended in the water.

25. A washing machine comprising in combination, a tub, said tub having a main body portion, the interior of which is substantially free of scrubbing projections, and a bottom portion, a rotary reciprocatory liquid impeller mounted for operation in a fixed plane in the tub, the outer portion of which is spaced a considerable distance from the body portion of the tub and having a plurality of blades projecting therefrom, said tub and impeller being so constructed and positioned relative to each other that when the impeller is rapidly reciprocated each blade and its adjacent portion of the impeller base will simultaneously drive the cleansing fluid in one and then an opposite outward circulatory direction away from the plane of the impeller through and around the clothes, and act in cooperation with the interior of the tub to cause violently opposed currents of fluid to meet and flow inwardly and in a general vertical direction toward the impeller, whereby the materials are substantially suspended in the fluid and cleansed while thus suspended, a driving shaft extending into the tub on which the impeller is mounted for movement therewith, and power means for rapidly reciprocating the shaft and impeller.

26. In a washing machine for cleansing fabrics by forcing cleansing fluid through them while substantially suspended by the action of the fluid, as distinguished from pulling or pushing the fabrics through the fluid or against scrubbing surfaces, or otherwise scrubbing them by mechanical means, a tub, a substantially imperforate rotary reciprocatory impeller mounted to operate in a fixed plane having blades of substantial height and area projecting therefrom in a direction toward the fabrics while they are being cleansed, said tub and impeller being so constructed and arranged as to cooperate while the impeller is in operation for whipping the fluid and violently forcing it outwardly, upwardly and in a general vertical and circulatory movement and circumferentially of the tub first in one and then in an opposite direction and through and around the materials, and substantially suspending the materials in the fluid while being washed, and power means for rapidly reciprocating the impeller.

27. A washing machine comprising in combination, a tub having an inner surface free from rubbing projections, said tub having a vertical portion and a bottom portion inclined outwardly and upwardly toward and merging with the vertical portion, an imperforate rotary reciprocatory impeller mounted for operation in a fixed plane near the bottom of the tub, the outer portion of which is spaced a considerable distance from the interior of the vertical portion of the tub, said impeller comprising a base of substantial area, a plurality of uniform radially dis-

posed and equally spaced blades projecting upwardly at substantially right angles from the base, each blade being of substantial height and lateral area, and a central portion projecting upwardly from the base, a driving shaft extending through the bottom of the tub on which the impeller is mounted for movement therewith, and means mounted beneath the tub for imparting to the shaft and impeller a rapid rotary reciprocatory motion.

28. In a washing machine, a tub having a substantially smooth inner surface free from rubbing projections, adapted to contain cleansing liquid and materials to be cleansed, said tub having a vertical portion and a portion inclined downwardly and inwardly from the vertical portion and merging therewith, an imperforate rotary reciprocatory impeller mounted near the bottom of the tub, the outer portion of which is spaced a considerable distance from the interior of the vertical portion of the tub, comprising a base of substantial area and a plurality of uniform equally spaced radially disposed blades projecting upwardly from the base, each blade being of substantial height and lateral area at its outer end and decreasing in its lateral area toward its inner end, and a central portion projecting upwardly from the base into which the inner end of each of said blades merges, a driving shaft extending through the bottom of the tub on which the impeller is mounted for movement therewith, and means mounted beneath the tub for imparting to said shaft and impeller a rapid rotary reciprocatory motion.

29. In a washing machine, a tub adapted to contain cleansing liquid and materials to be cleansed, a rotary reciprocatory impeller mounted adjacent the bottom of the tub, comprising a substantially imperforate base of substantial area and blades of substantial height and lateral area projecting from the body of the impeller toward the materials while being washed, said impeller and tub being so constructed and arranged that they will cooperate, when the impeller is rapidly reciprocated, to cause the liquid to be positively forced outwardly, upwardly and circumferentially along the interior of the tub in one general direction, and then outwardly, upwardly and circumferentially along the tub in the opposite general direction, whereby the materials being washed will be cleansed, the change in direction of movement of the impeller being accomplished suddenly and forcibly to whip the liquid and vigorously force it first in one direction and then in the opposite direction through and around the materials while substantially suspended therein by the action of the liquid, and power means for rapidly reciprocating the impeller.

30. In a washing machine, a tub having its bottom merging smoothly into its side portion to facilitate the movement of laterally upward circulatory currents, and having the interior of its side portion substantially smooth and free from rubbing elements, for containing a cleansing fluid and materials to be cleansed, a rotary reciprocatory impeller mounted near the bottom of the tub, said tub and impeller being so constructed and arranged as to act in cooperation while the impeller is in operation, for whipping the fluid and violently forcing it first in one and then in an opposite laterally upward circulatory general direction against the interior of the tub and through and around the materials, and suspending the materials in the fluid by the moving fluid while being washed, said impeller comprising a substantially imperforate base and blades of substantial height and area projecting upwardly therefrom, and motor driven means extending through the bottom of the tub for imparting to the impeller a rapid rotary reciprocatory motion, substantially as described.

31. In a washing machine, a tub having a substantially smooth interior free from rubbing elements for containing a cleansing fluid and materials to be cleansed, a rotary reciprocatory impeller mounted near the bottom of the tub, said tub and impeller being so constructed and arranged as to cooperate while the impeller is operated for violently forcing the fluid first in one and then in an opposite outwardly and upwardly circulatory general direction against the interior of the tub and through and around the materials, and substantially suspending the materials in the fluid while being washed, said impeller comprising a substantially imperforate base and blades of substantial height and area projecting upwardly therefrom, and motor driven means extending through the bottom of the tub for imparting to the impeller a rapid rotary reciprocatory motion.

32. In a washing machine for cleansing fabrics by forcing cleansing fluids through them while substantially suspended by the action of the fluids as distinguished from pulling or pushing fabrics through fluids or against scrubbing surfaces or otherwise scrubbing them by mechanical means, a tub, a rotary reciprocatory impeller mounted for normal operation in a fixed plane, said tub and impeller being so constructed and arranged to cooperate while the impeller is in operation for whipping the fluid and violently forcing it first in one and then in an opposite outward, axial and circulatory general direction against and approximately parallel to the interior of the tub and through and around the materials and substantially suspending the materials in the fluid while being washed, said impeller comprising an imperforate base and blades of substantial height and area projecting therefrom in a direction toward the materials being cleansed, and power

means for rapidly reciprocating the impeller.

33. In a washing machine, a tub substantially free from scrubbing projections for containing a cleansing fluid and materials to be cleansed, a rotary reciprocatory impeller mounted near the bottom of the tub, said impeller comprising an imperforate base and blades of substantial height and area projecting upwardly therefrom, said tub and impeller being so constructed and arranged as to act in cooperation while the impeller is operated for whipping the fluid and violently forcing it first in one and then in an opposite outwardly upwardly circulatory general direction, against the interior of the tub and toward and through the materials, and substantially suspending the materials in the fluid while being washed, and power means for rapidly reciprocating the impeller.

34. In a washing machine, a tub whose interior is free from substantial scrubbing elements adapted to contain a cleansing fluid and materials to be cleansed, a driving shaft extending into the tub through the bottom thereof, an impeller on said shaft to oscillate therewith, power means for oscillating said shaft and impeller, the impeller comprising an imperforate body portion, and blades extending from said body portion on the face presented to the materials being cleansed, the blades being of a substantial dimension in a direction at right angles to the body portion, said tub, blades and adjacent portions of the body portion of the impeller being so constructed and arranged in the tub relative to its interior that when the impeller is oscillated the fluid in the tub will be thrown violently outward against and around the interior of the tub, from the edge of the impeller, first in one and then in the opposite general direction, whereby the fluid will be driven in circulatory paths away from the impeller, along the sides of the tub in opposed directions, then inwardly and toward the impeller, this cycle being continuously repeated while the materials are substantially suspended by the fluid and out of substantial scrubbing contact with the impeller or tub.

35. A washing machine comprising in combination, a tub for containing water and goods to be washed, said tub being substantially free from rubbing projections, a rotary reciprocatory impeller in the tub having flange-like means extending therefrom of substantial height and lateral area, said tub and impeller, together with its flange-like means, being so constructed, proportioned and arranged with respect to each other that while the impeller is in operation the fluid will be rigorously moved about in devious paths within the tub, and the resultant general direction of the movement of the cleansing fluid and the materials to be cleansed is normally radially outward from the central portion of the tub, then vertically, and a general rotary progression about the inside of the tub first in one and then an opposite direction, and then inwardly toward the impeller whereby the fabrics will be cleansed while substantially sustained by the action of the fluid, and will be freely and continuously driven about in the fluid by the movements thereof in a turbulent manner, and in devious paths, and motor driven means for rapidly reciprocating the impeller for the purposes set forth.

36. In a washing machine, a tub free of scrubbing elements for containing a cleansing fluid and materials to be cleansed, an imperforate rotary reciprocatory impeller, blades on the impeller, said tub and impeller together with its blades being so constructed and arranged with respect to each other that while the impeller is in operation the fluid will be rigorously moved about in devious paths within the tub, and the resultant general direction of the movement of the cleansing fluid normally radially outward from the central portion of the tub, then vertically and in a general rotary progression about the inside of the tub, first in one and then in an opposite direction, and then inwardly toward the impeller, whereby the fabrics will be cleansed while substantially sustained by the action of the fluid and will be freely and continuously driven about in the fluid by the movements of the fluid in a turbulent manner and in devious paths, and power means for imparting reciprocations to the impeller.

37. In a washing machine, a tub for containing fluid and materials to be cleansed, a rotary reciprocatory impeller mounted for oscillation in a substantially fixed plane having a substantially imperforate base and a plurality of blades, said tub and impeller being so constructed and positioned relative to each other that when the impeller is rapidly reciprocated each blade and its adjacent portion of the impeller base will simultaneously drive the cleansing fluid in one and then an opposite outward, upward, circulatory direction and act in cooperation with the interior of the tub to cause violently opposed currents of fluid to meet and flow inwardly and downwardly toward the central portion of the tub and substantially suspend the materials in the fluid while being washed, and power means for rapidly reciprocating the impeller.

38. The method of washing fabrics by forcing cleansing liquid through and around them while substantially suspended by the action of the fluid, as distinguished from pulling fabrics through the fluid against scrubbing corrugations, or otherwise scrubbing them by mechanical means, comprising immersing the fabrics in a washing fluid in a container, then vigorously and rapidly impelling the washing fluid in one and then in an opposite outward circulatory direction away from the plane of the source of impul-

sion and through the fabrics and circumferentially along the interior of the container in rapid succession, and causing these violently opposed currents of fluid to meet and flow inwardly and toward the central portion of the container, and toward the source of impulsion thereby substantially suspending the fabrics in the fluid and cleansing them while thus suspended.

39. The method of washing fabrics by forcing cleansing fluid through them while substantially suspended by the action of the fluid, as distinguished from pulling fabrics through the fluid against scrubbing corrugations, or otherwise scrubbing them by mechanical means, comprising immersing the fabrics in a washing fluid in a container, then vigorously agitating the washing fluid and rapidly forcing it toward the fabrics and away from the plane of the source of agitation vertically along the interior surface of the container first in one and then in an opposite circumferential direction, back and forth through and around the fabrics, and causing the violently moving opposed currents of liquid to meet and flow inwardly and vertically toward the source of agitation whereby the fabrics are caused to be freely moved about by the action of the fluid and cleansed while thus moved.

In witness whereof, I hereunto subscribe my name to this specification.

HOWARD F. SNYDER.

DISCLAIMER

1,866,779.—*Howard F. Snyder*, Newton, Iowa. WASHING MACHINE. Patent dated July 12, 1932. Disclaimer filed February 23, 1937, by the assignee, *The Maytag Company*.

Hereby enters its disclaimer of claims 1 and 38 of said Letters Patent.

[*Official Gazette April 6, 1937.*]

1040a (Plaintiff's Exhibit 2.)

United States District Court, Western District of Missouri, Western Division

The Maytag Company, a corporation, Plaintiff,
2892 vs. In Equity
General Electric Supply Corporation, a corporation, Defendant.

To facilitate the trial of this case, the following stipulations are hereby made by and between counsel for the respective parties:

1. Plaintiff, The Maytag Company, is a corporation duly organized and existing under the laws of the State of Delaware and having an office and place of business at Newton, Iowa.

2. Defendant, General Electric Supply Corporation, is a corporation organized and existing under the laws of the State of Delaware and having a regular and established place of business at 1411 Walnut Street, Kansas City, Missouri.

3. Plaintiff, The Maytag Company, is the owner of letters patent of the United States No. 1,866,779 to Howard F. Snyder, issued July 12, 1932.

4. Defendant, General Electric Supply Corporation, within the Western Division of the Western District of Missouri and since the issuance of said Snyder patent and before the filing of the bill of complaint herein, sold the General Electric
1040b washing machine Model AW-19 which has been exhibited by plaintiff's counsel to defendant's counsel.

5. Plaintiff's counsel sent and defendant received in regular course of mail a notice of infringement dated February 1, 1937, copy of which is hereto annexed.

6. Uncertified printed or photostatic copies of United States and foreign letters patent may be offered in evidence with the same force and effect as the original or duly certified copies, and dates appearing thereon may be taken as prima facie correct, subject to correction of error if error appear.

7. The translation hereto attached of French patent No. 363,514 to Henin, granted May 7, 1906, may be accepted as a correct translation thereof, subject to correction of error if error appear.

8. Exhibits introduced in evidence at the trial of this case may be retained in the custody of the counsel producing

them, subject however to the return by counsel for defendant to Pennie, Davis, Marvin & Edmonds of all exhibits introduced by defendant herein which are also exhibits in the cases of Maytag vs. Easy and Maytag vs. Hurley, for production at the argument of the appeals now pending in those cases, and to their being produced at any subsequent proceedings in this case upon the request of either party after due and timely notice.

9. The General Electric Company published or issued and caused to be distributed for use in promoting the sale of its washing machines since January, 1931, certain literature, correct photostatic copies of which are hereto attached, to-wit:

1040c Page 47 of the October, 1934, issue of Better Homes & Gardens.

Circulars identified in defendant's Behan deposition as Plaintiff's Cross Exhibits 6-1, 6-2 and 6-3.

Directions for Using Your General Electric.

Pages 20 and 21 of the January, 1935 issue of Electrical Merchandising.

PARKINSON & LANE,
Counsel for Plaintiff.

Dated Nov. 29, 1937.

WATSON, BRISTOL, JOHNSON & LEAVENWORTH,
Counsel for Defendant.

Dated Nov. 29, 1937.

1040d Exhibit "A".

Parkinson & Lane
Bankers Building

Chicago February 1, 1937

General Electric Supply Corporation,
1411 Walnut Street,
Kansas City, Missouri.

Gentlemen:

Our client, The Maytag Company, has informed us that you are engaged in the sale of washing machines manufactured by the General Electric Company, at its factory in Bridgeport, Connecticut, and by it distributed through you in Kansas City, Missouri, and elsewhere, such machines being of the

gyrator or activator type and generally indicated as Models AW-19, 22P and 23P, and others.

Our client believes your sale of these machines to be an infringement of its patent to Howard F. Snyder No. 1,866,779, issued July 12, 1932, and has requested us to notify you in its name of this infringement and request you to promptly desist from further infringement. You are requested to pay over all profits, gains and advantages which you have derived from such infringing sales, as well as the damages which our client has suffered by reason thereof and in default thereof we are instructed to take steps to fully protect our client's rights in the premises.

The General Electric Company, the manufacturer of the machines above referred to, has heretofore been notified with respect to our client's patent and its infringement thereof.

Very truly yours,

PARKINSON & LANE.

2/b
Register

1040d

Translation of
French Patent No. 363,514

XVI. Clothing Industries.

5. Ironing, cleaning and pleating.

Washing machine of the hand-operated or motor-driven type.

E. F. Henin and A. H. Bougrand, residing in France

Date of application: Feb. 20, 1906
Date of allowance: May 7, 1906
Date of publication: Aug. 2, 1906

This washing machine is designed so that the agitator which is vertically disposed in the tub is given an oscillatory motion by manually-operated or power-driven means, as may be required, operation of the washing machine by either of these two means being such that there is no necessity for dismounting any of the component parts since all that is needed to operate a clutch when power is used or attach a handle when manual operation is contemplated.

The construction and operation of this washing machine will be readily understood by reference to the following description and the drawings attached thereto.

Fig. 1 is a side elevation of the washing machine. Fig. 2 is a cross-section through the tub, the power-transmitting means not being shown. Fig. 3 is a view of the washing machine seen from below. Fig. 4 is a plan view (with the cover removed) and Fig. 5 is a cross-section through the upper part of the tub, the drain board and the cover being illustrated.

1040e The machine comprises a tub a, made of hard wood, the interior of which is provided with riffles b, and which is supported by four legs c, which can be made of wood, iron, castiron, etc., and may be provided with lugs for securing the washing machine firmly to the floor. The staves which constitute the tub are held together by four steel bands d the uppermost of which is ribbed for the purpose of preventing any warping of the tub under the action of the detergent composition. The joints of the staves and the bottom are joined together to ensure perfect tightness and preclude any possibility of dislocation. At its lower part the tub carries a drain cock for drawing off the rinsing water or detergent solution after each run.

Extending upwardly into the tub through an opening in the center of the tub bottom is a copper tube e which carries at its lower end a flange f which is screwed to the outer surface of the tub bottom. This tube is intended to act as a guide for the shaft i which extends inside of the sleeve e; for this purpose tube e carries two bronze bushings, g, h, one at its lower end and the other at its upper end. It will likewise be seen that this sleeve has the advantage of preventing access of water to the shaft i. The latter, of machined steel, extends above the top of the sleeve e and terminates in a squared end k; its lower end acts as a center-pivot, bearing upon a three-armed bracket n screwed onto the bottom of the tub.

Mounted upon the squared end k of the shaft i is a member known as an agitator, which comprises a disc l conforming to the inner diameter of the tub, a hollow wooden shaft 1040f m upon which is mounted a cast-iron member with a square socket corresponding to squared end k and carrying vanes and ribs radially arranged around the shaft m.

The disc l is constructed of a plurality of crossed wooden slats (Fig. 4) for the purpose of preventing warping by the hot water; intervening spaces o are left between these slats for the purpose of facilitating the circulation of the water or of the detergent solution; on its periphery the disc l carries a copper ring p of semi-cylindrical cross-section which fits the contour of the slats snugly and covers the sharp edges of the ends of the slats. The hollow wooden shaft m is secured to the center of the disc l, with the shaft i and the outer sleeve e extending upwardly into the bore of the shaft m. Securely attached to the upper end of shaft m by means of screws and co-operating prongs extending into the wood is the cast-iron member o which carries a square-socketed bushing which fits exactly upon the squared end k of shaft i. This cast-iron member is covered by a copper jacket r, a screw s holding all these parts firmly together. Attached to these two principal members, viz., the disc l and the shaft m, by means of grooves and screws are the perforated ribs and vanes u for the circulation of the water. Copper screws or nails are preferably employed for securing together the various elements which make up the agitator for the purpose of preventing rust. Attached to the lower part of the shaft i by means of a cotter pin is a cast-iron member v to which is pivoted at x a fork y which is connected to a crank z by means of the connecting rod a′. The relative lengths of the elements v, y, z are calculated in such a way that during each turn of the crank z there is imparted to the element v and hence also to the shaft i, an oscillatory motion equal to one-third of a turn in each direction. At each end of the stroke the element v engages the spring controlled stops b′ which act as shock absorbers.

1040g

The machine is started by rotating the fly wheel d′, with the crank handle e′, the rotary motion being transmitted by means of the two bevel gears f′ and g′ and the shaft h′ to the crank z. A ball bearing i′ minimizes friction. The entire drive mechanism is mounted upon a cast-iron bracket k′ bolted to the tub.

A movable board l′ serves as a drain for the wet linen or to hold the soap, etc., while at the same time it acts as a cover for the tub; a cover m′ closes off the other part of the tub.

For the purpose of employing a power drive, the shaft of the fly wheel is extended and fitted with two pulleys, one of which, n′, is secured to the fly wheel, the other o′ is an idler.

The dimensions of these pulleys are such that it is always possible to actuate the machine either by hand or by power, by removing the belt or the crank handle, respectively. The belt shifting gear mechanism is attached to the end of the shaft by means of a stud bolt, being simply an angle bracket provided with a fork and lever.

Resumé

This invention relates to an improved laundry washing machine which can optionally be operated manually or
1040h driven by mechanical power, and which has the following characteristic features:

1) The putting into oscillatory motion of the inner plate carrying the beaters by means of a crank and a pitman for the purpose of giving this disc a stroke in each direction equal to one-third of a turn of the crank.

2) A shock absorbing device for facilitating the reversal of direction at each end of each stroke, said device comprising two spring-controlled stops engaged by the crank mounted upon the agitator shaft.

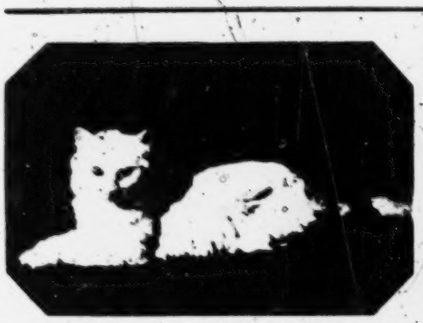
3) The actuation of the agitator by hand or by mechanical power by means of a belt-shifter or by a removable crank on the fly wheel which, through the intermediary of two bevel gears, a vertical shaft and a crank, transmits the motion to the pitman which actuates the agitator.

4) An interior disc comprising crossed wooden slats, in combination with wings and ribs, for the purpose of preventing the batch of linen from becoming packed at the bottom of the tub.

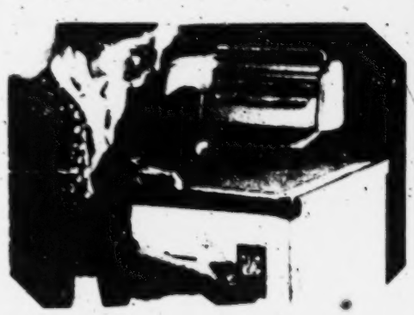
5) The arrangement of the means for imparting motion to the agitator, or the underside of the tub for the purpose of leaving free the upper part of said tub so as to permit of placing into the latter sheets and linen pieces of large dimensions.

HENIN & BOUGRAND,
By power of attorney
Armengand Jeune.

It's miracles like these NEW washers that have made General Electric famous!

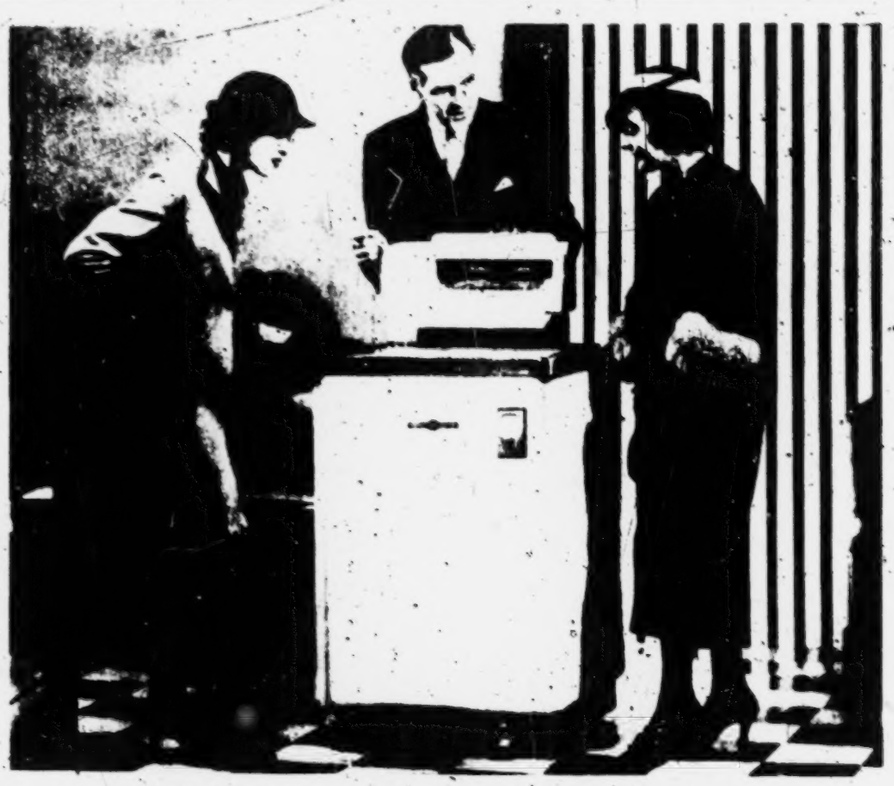


New ***You have to listen twice to hear it!*** Never before has a washer been so quiet! Actually, the New G-E, running at full speed, is as quiet as a kitten's purr. It doesn't sound like a powerful machine doing a tubful of dirty clothes. But lift the lid—and you'll see that there's plenty doing inside!



New ***You don't have to guess at the temperature of your suds!*** The New G-E model pictured has a Temperature Indicator right on the cabinet. Tells you when the water is just right for (1) sunfast colors, (2) silks and woolens, (3) cottons and linens, (4) wash and rinse. Think what this saves you in the life of precious fabrics.

New ***It leaves buttons ON—No more scenes like this!*** The New G-E Washer is most remarkable of all because of the way it washes clothes. In a few minutes, it can prove to you that the rubbing and pommeling methods of 3,000 years have been wrong! Clothes DON'T have to be worn out before their time. See the almost miraculous way the exclusive G-E Activator forces suds through fabric, makes suds and water currents do all the work.



New ***It's easily the smartest looking washer ever made!*** Designed like a fine piece of modern furniture—marks a new day in the appearance of washing machines. All moving parts completely covered. Makes a handsome and useful table. Easily cleaned. Costs no more than ordinary washers . . . . Only **$49.50** AND UP

YOUR General Electric dealer will show you the NEW LINE of G-E Washers with more than the usual "sales talk"—with real pride in his voice.

For General Electric engineers have made these washers more than "new models" or "improved editions."

They've gone to the very roots of washing clothes. They've asked, "Do dirty clothes actually *have* to be rubbed, or pounded, to get them clean? Isn't there some gentler way?"

They've watched hand washing . . . how sudsy water is forced through fabric, and designed a washer that copies this gentler hand method—on a high-speed scale.

The G-E Activator, specially designed, washes even heaviest pieces as you wash dainty lingerie—by gently forcing suds through the fabric, many times a minute.

See this NEW kind of washing machine. You'll delight in the double-quick time it turns out the snowiest wash. And look! *No oiling ever required!*

You'll like the G-E "one control" Wringer, too—only 1 control instead of 4. And the price? As low as $49.50.

For full details, write Mr. J. M. Wicht, manager, Home Laundry Equipment Sales, General Electric Co., Dept. H-5910, Bridgeport, Conn.

New ***This washer is managed by foot control alone!*** No stooping to start the Activator or stop it. Or to pump out the dirty water. It's all managed by a touch of your foot on the pedals. General Electric is the first to offer you this complete foot-control.

Prices slightly higher in the west, mid-west and south.

GENERAL ELECTRIC

HOME LAUNDRY EQUIPMENT

RAB

PART OF PLAINTIFF'S EXHIBIT 2.

587

Nursery schools are built upon the idea that the most important years for learning habits and attitudes are from 2 to 6 years

Shall I Send My Child to Nursery School?

By Gladys Denny Shultz

Better Homes & Gardens' Child Care and Training Director

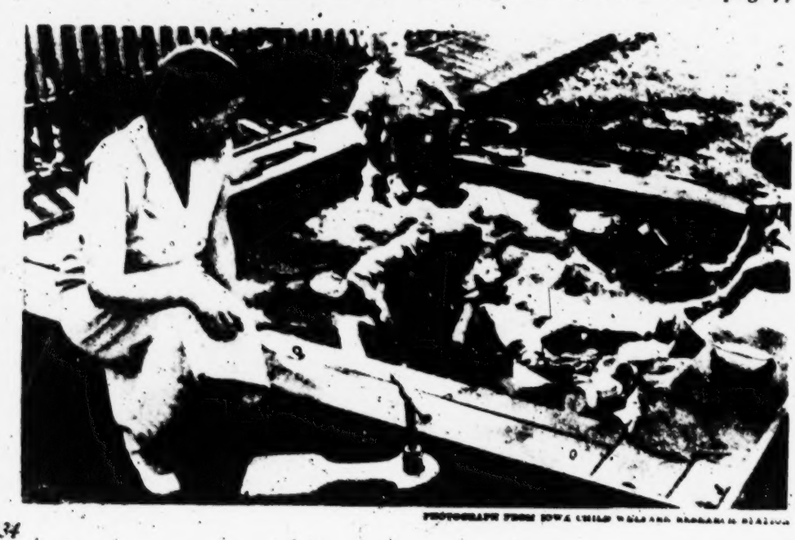
IT IS housecleaning time. In addition to the usual upset attendant upon this operation, cupboards are being painted and all those seldom-used objects which generally repose upon high shelves lie exposed and defenceless upon chairs and tables.

The situation has provided marvelous mental stimulation for a certain 4-year-old boy whom it is my responsibility and desire to keep intact as far as possible. The high ladder for the first time affords ready access to the roof. The big wrench has been used to turn the screw cap on the gas tank of the car, a perfume atomizer has sprayed the wall of the garage with a fragrant shower. As for the cans of paint, they have furnished just one inspiration after another.

It is therefore with a certain keen personal feeling that I address myself to the subject, "Shall I send my child to nursery school?" Is it cowardice for a mother—say, at housecleaning time—to dream of some haven where runabouts may get superlative care and training without annoyance to her? Is it a neglect of duty to delegate to others the tasks that heretofore have belonged to the mother, or at any rate have been carried on in the home?

Until recently most parents have not been much concerned because the number of nursery schools has been relatively small. The Educational Emergency Relief program, however, gave the movement great impetus by conducting temporary nursery schools last spring in thousands of communities which had not had a kindergarten or nursery school. The next step will come as soon as economic conditions permit. Educators feel that the nursery school has proved its worth and should be incorporated in the public-school system whenever funds can be made available for this purpose. To us as parents and voters both, therefore, the question may before long become a real one. How shall we answer?

First, let us understand fully what a nursery school is and what it does for children. As the name indicates, it is for youngsters of the pre-school age. Some take tiny folks of 18 or even 14 months, but the usual ages are from 2 to 4 years. The theory upon which the movement is founded is that these are the most important years in life from the point of view of building habits [*Continued on page 77*



Children are allowed to play freely, are not interfered with unless necessary, but they are taught essential disciplines

PART OF PLAINTIFF'S EXHIBIT 2.

589

The Balloon Bubble Test

Here is another unique and positive demonstration that shows the ACTIVATOR'S washing action . . . . and helps to clinch the sale.

Place a sheet in the tub along with some other articles—making sure that the sheet "balloons" and stays fluffed up with a large air bubble between the sheet and the water surface—then start the washer. Notice how the sheet is drawn down through the different zones into the Full Power Washing Zone. Gradually but surely the air is forced out of the bubble as the sheet is drawn down.

The ACTIVATOR'S action tugs and pulls every article gently but surely into the Full Power Washing Zone. No article will float idly or remain long on the surface of the water once the ACTIVATOR starts. There are no dead areas in a G-E Washer equipped with the ACTIVATOR.

AND HERE ARE IRONER DEMONSTRATIONS, TOO

G-E has originated these two forceful demonstrations in order to increase your Ironer sales. They are simple, easily explained and practical to use on every ironer prospect. Take advantage of them.

The Soaked Sponge Test

1. Release the shoe of the ironer so that it can be tilted backward. Place a wet sponge in the "hollow" of a cold shoe and let it remain there as long as you wish. The brilliant, highly resistant surface is impervious to water. It will not rust. Naturally such a rust-free surface cannot discolor the clothes which are ironed. Furthermore, because the surface does not rust, it cannot become corroded and pitted. Every housewife knows that a smooth ironing surface is essential for good ironing.

Let your prospect know that the wet sponge, even though it has been there many days, has had no effect on the surface of the ironer shoe.

The Free Towel Demonstration

Have your demonstration ironer out where it can be seen easily by everyone who enters your store. Ask your prospect to sit down and iron a towel. This will acquaint her with the machine and create interest.

Explain each operation to her. Then after the towel is ironed, make her a present of it. This is a valuable goodwill builder and will create comment, and serve to draw many women into your store. This is an effective way to build a live list of ironer prospects. Write Merchandise Department, General Electric Company, Bridgeport, Connecticut, for suggestions.

Be sure all your sales people—whether they sell inside or outside, know these five simple, easy-to-make, convincing General Electric Washer and Ironer demonstrations. They open the way to bigger and better profits.

200,000,000 *of these Monograms now in American homes.*

H-118—1-31

PART OF PLAINTIFF'S EXHIBIT 2.
591

Turn DEMONSTRATIONS into DOLLARS

The Towel Tug Test

and

other easy Store Demonstrations that Sell

Home Laundry Equipment

U.S.D.C. W.D.Mo.W.D.
In Equity 2892

Pltf's. Cross Ex.
No. 6-1

PART OF PLAINTIFF'S EXHIBIT 2.

593

AN EFFICIENT WASHER SHOULD HAVE WASHING ZONES OF VARYING INTENSITY

The General Electric Washer is not just another washer . . . but a far superior washer . . . because of the ACTIVATOR.

The performance of the ACTIVATOR is demonstrated by the Towel Tug and Activation Tests. You see how clothes are washed as individual pieces . . . without tangling or braiding. You see the multiple principles *work*. You actually *feel* the tug of the varying zones.

In making the Towel Tug Test we must first appreciate that, contrary to general belief, all of the water area in a washer does not wash in the same manner or with the same degree of intensity. By this we mean, some zones are more active than others.

This is logical, because a too gentle or a too vigorous washing zone would not accomplish the desired results—a thoroughly clean wash without unnecessary wear or tear. The ACTIVATOR, because of its unique construction, produces varying zones of washing intensity as is shown in the chart shown. This chart shows graphically how these zones are developed in General Electric Washers equipped with ACTIVATORS.

Notice that the Full Power Washing Zone (or the zone of highest washing activity) exists at the tips of the ACTIVATOR blades. And that the upper zones have the desirable and more gentle activity.

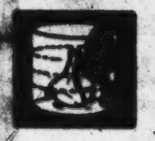
The Towel Tug Test Demonstrates These Varying Washing Zones in the General Electric Washer

These varying zones of washing intensity in the General Electric Washer can be actually felt and visibly demonstrated by the Towel Tug Test. This test is simple, quick, dramatic . . . and thoroughly convincing.

The Towel Tug Test

Start the ACTIVATOR and fill the tub with 6 or 7 pounds of wash. Then lower a towel (wet or dry) until the end is beneath the water level about two or three inches. A slight but perceptible tug or pull will be felt. This indicates the zone of gentle washing and soaking action.

Then lower the end of the towel to about six inches below the water level. Here, a more distinct and stronger tug will be felt. The end of the towel is now in a zone of greater intensity . . . and more washing activity.



Next lower the towel until the end of it is near the bottom of the tub. Now it is in the *Full Power* Washing Zone and is receiving the strongest washing action. The increased, steady strong tug, like the pull of a 10-lb. trout, shows that the most vigorous action is produced down near the tips of the ACTIVATOR blades.

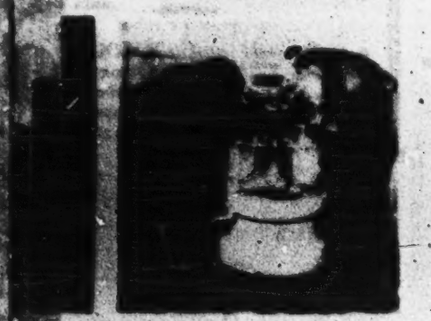
Plan to use this simple test on every prospect. It dramatizes and shows the ability of the ACTIVATOR which is the "heart" of the G-E Washer. It takes but little time and effort and requires no special equipment. It is a sure way of creating interest and desire.

The Activator

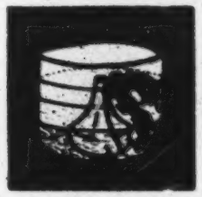
You have now proved to the prospect that there are varying zones of washing activity in the G-E Washer. This is a desirable and important factor. Lacking such activation, the clothes in the top of the tub or in the middle and less vigorous zones, would receive only a gentle washing or soaking while the clothes at the lower part of the tub would receive a more vigorous scrubbing than is needed. It is important, therefore, that a washer have varying washing zones—and that clothes are *continually circulated* through these zones.

The ACTIVATOR creates direct movement for every article in the tub through the various zones at short intervals—thus assuring that each article is efficiently washed. The constant circulation of the clothes through the three zones does the work.

The Activation Test



To prove this constant movement of clothes through the washing zones of a General Electric Washer, toss a colored towel into a tub containing 5 or 6 lbs. of white wash. Watch the towel swirl, roll over, spin down to the *Full Power* Washing Zone, there to be flexed back and forth by the ACTIVATOR blades while hot sudsy water is forced through the fabric, then shot up to the surface, and again, returned to the Full Power Washing Zone. (A clear glass tub is more effective when making this demonstration. White Merchandise Department, General Electric Co., Bridgeport, Conn., for details regarding this clear glass tub.)



When making the Activation Test have the prospect *look down into the tub*. Call to the prospect's attention the circulation of the clothes through the various zones . . . . up from the bottom of the tub, then down the curves of the ACTIVATOR to the Full Power Washing Zone . . . . then up again . . . . down again . . . . up . . . . down . . . . repeated over and over. (See chart below.)

Also have the prospect watch the movement of the clothes looking through the side of the special glass tub. Call attention to the *roll-over* movement of the clothes through the water similar to that of a barrel rolling across a floor. This roll-over movement flushes water through the fabrics—loosening and removing embedded dirt.

This simple activation test clearly shows the six multiple actions of the ACTIVATOR:

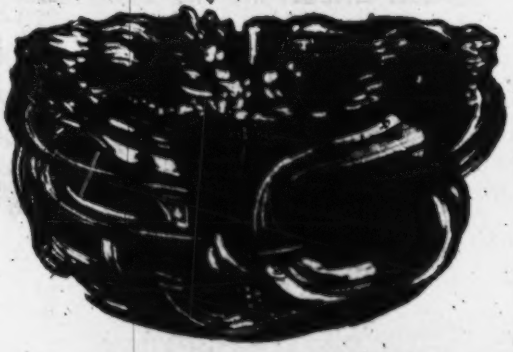
1. Effective washing action starts at water level.
2. Sturdy, downward tug sweeps out air bubbles and pulls clothes into Full Power Washing Zone at tips of ACTIVATOR blades.
3. Flexing of clothes to loosen embedded dirt particles.
4. Forcing of hot sudsy water through clothes by ACTIVATOR blades.
5. The swirling water action washes clothes as individual pieces, no braiding.
6. Circular roll-over movement of clothes through soapy water with a continuous return to the Full Washing Zone. No dead washing zones.

Remember that efficient washing should give all the clothes a gentle washing, soaking and flexing to loosen embedded dirt as well as a more vigorous washing action that forces hot sudsy water through the fabric to sweep away the loosened dirt. *The ACTIVATOR gets the dirt.*

3905

PART OF PLAINTIFF'S EXHIBIT 2.

Introducing the



ACTIVATOR

as designed by G-E engineers for exclusive use in the new

GENERAL ELECTRIC WASHER

The ACTIVATOR washes clothes as individual pieces without tangling or bunching. One of the six multiple actions of the ACTIVATOR gently flexes the clothes to loosen embedded dirt—another action forces hot sudsy water through the fabric to remove the loosened dirt. *The ACTIVATOR gets the dirt.*

The amazing performance of the ACTIVATOR is demonstrated by the Towel Tug Test—you see the clothes washed as individual pieces—you actually FEEL the multiple principle work. Come in and see this amazing demonstration—hold the towel yourself.

U.S.D.C. W.D.Mo.W.D
In Equity 2892

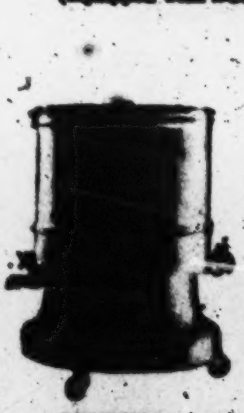
Plff.'s Cross Ex 6

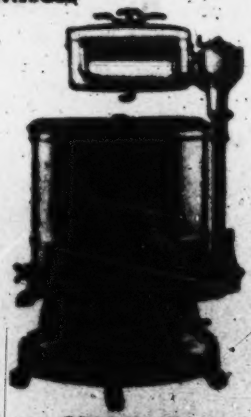
GENERAL ● ELECTRIC

HOME LAUNDRY EQUIPMENT

2 Washer Models

(Equipped with ACTIVATOR)





MODEL C

With spinner basket which lifts clothes ACTIVATOR. Has handling "wringer" a tub full of clothes with another pool to being washed. 9 lbs. capacity.

MODEL W

Equipped with powered wringer with large swivel rolls for fast effective work. Wringer pressure instantly released. 9 lbs. capacity.

Ironers, too

MODEL R

Slips over wringer post of washer models W and R. Stainless steel shoe.

MODEL T

For table use anywhere. Stainless steel shoe. Has carry-open and for heavy pieces.

$10 DOWN—less than that a month puts a G-E Washer with ACTIVATOR in your home.

OVER

U.S.D.C. W.D.Mo.W.
In Equity 2892
Pltff's Cross Ex.

The New G-E Double-Tub Washer

NO more frayed cuffs or collars—no more torn sheets—no more fears for silken lingerie—for in this washer your clothing gets a thorough scrubbing on a "washboard of clean soap suds."

Here, at last, is a washer that does *all* the work. Washing, rinsing, wringing—and so easily and quickly that you can well imagine you have a complete laundry at your command. At a touch of the switch the famous G-E ACTIVATOR starts a steady *swish-swish* of the clothes guiding them up and down, through all the washing zones, forcing water quickly and surely through each individual piece, always gently—never harshly. How effortless it is to transfer the clean clothes from one tub to the other—just lifting them over a slight partition for the damp drying at the touch of another conveniently located control. No need to worry about getting rid of the dirty water—a handy pump transfers water into the sink or drain. And too, there's a filler hose to help fill the washer with water.

Here's Why You Need the Double-Tub

Just as the G-E FLATPLATE is a great advance over hand ironing so the G-E Double-Tub is the last word in washing machines. This washer enables you to dispense with laundry tubs. The two tubs take care of all demands. Whether it be lacy lingerie, woolen blankets, greasy overalls, fluffy pillows, the G-E Double-Tub washes and damp-dries quickly, easily and thoroughly. Have this G-E Double-Tub demonstrated in your home and learn how it can start to save for you the moment it starts in to work.

With the Exclusive ACTIVATOR

The ACTIVATOR [illegible] Different from [illegible] by *water action alone*—with no harsh scrubbing. That is why it is safe to wash even your daintiest pieces. Because of its unique design the currents set up by the ACTIVATOR'S motion cause the clothes to be flexed, and hot sudsy water to be forced through the mesh of the fabrics, thus assuring a perfectly and thoroughly done washing. The ACTIVATOR eliminates tangling and braiding—the common occurrence that causes clothes to wrap tightly around the ordinary agitator post and cause tearing and straining. Make the Towel Tug Test and see how the ACTIVATOR works.

A Modern Washer for Modern Homes—General Electric Double-Tub

GENERAL ELECTRIC WASHER

PART OF PLAINTIFF'S EXHIBIT 2.

GENERAL ELECTRIC WASHER

Here's GENERAL ELECTRIC'S *Latest Helper for you*

The most appealing washer ever built. Designed, inside and out, to make washing a simple, tireless and effortless procedure. This advanced, Double-Tub washer does all the work . . . washing, rinsing and drying with but little attention. The marvelous ACTIVATOR and the Super Spin-Basket, both exclusive G-E features, assure safe thorough washing and quick drying. A quick action, automobile type pump empties the tub in about two minutes . . . no lifting of water necessary.

Note the attractive, mottled blue finish on the porcelain tubs. The base and the skirt are finished in china blue to harmonize with the tubs. Highly polished aluminum splash rim and covers help to make this washer unsurpassed in its appeal. All controls are on a panel where they are easy to reach . . . no stooping required. A genuine G-E ¼ horsepower motor assures trouble-free service—year in and year out.

Simple . . . Economical . . . Thorough.

Does *All* the Washing for you . . . *The New* GENERAL ELECTRIC DOUBLE TUB WASHER

SAVE IN SIX WAYS

. . . through this new improved General Electric Double-Tub Washer with the exclusive ACTIVATION principle.

Here's how the Double-Tub saves in six ways.

1. Saves space—by the square design, the washer fits conveniently into any corner.
2. Saves time—by washing faster and damp-drying more quickly.
3. Saves effort—by eliminating heavy lifting of soaked clothes and buckets of water.
4. Saves rubbing—by washing out all of the loosened dirt.
5. Saves mending—by the ACTIVATOR principle, the clothes are washed gently but positively, preventing wear, tear and strain.
6. Saves money—by doing more in less time, saving laundress wages and reducing wear and tear on clothes.

More Time for Recreation—thanks to the efficient Super Spin-Basket

Women count these days. That's why the Super Spin-Basket was built for this washer. It not only saves time, but effort—worry. And best of all it dries so perfectly. It's faster because of its efficient design and high speed. It's safe because it has no rough edges or sharp points to catch and damage your most delicate laces or fabrics. It's economical because you can be certain that one load clothes while you're dampdrying another.

No more squeezing or twisting, no more tedious piece-at-a-time feeding, just pleasant unloading from one tub to the next, a touch of the switch—and in a few minutes clothes so nearly damp-dried that, in an emergency they can even be ironed.

Sheets, towels, blankets, turkish towels, overalls, lingerie—they're all dried quickly in the Super Spin-Basket.

WE SUGGEST THAT YOU KEEP THIS CARD IN SOME CONSPICUOUS PLACE

DIRECTIONS

For Using Your

GENERAL ELECTRIC

Washer

MODEL "2G"—EXTRACTOR TYPE

YOU have chosen wisely in selecting a General Electric Washer—you will find it remarkably efficient and easy to operate. Many years of washing enjoyment will be yours if these brief instructions are carefully followed.

Sorting and Preparing Wash

Material to be washed should be carefully sorted; the following grouping is suggested.

1. White clothes, (table linen, bed linen, men's shirts, etc.)
2. Silks, chiffons, etc.
3. Flannels and woolens.
4. Colored articles, ginghams, etc.
5. Dark articles, socks.
6. Overalls, etc.

Note: It is not necessary to change the washing water after each lot. The frequency with which the water should be changed depends upon the soil of the clothes.

It is not necessary to boil wash. The vigorous, yet gentle, action of the ACTIVATOR loosens and removes the dirt without boiling. In addition, fatty body oils (which cause the soil in wrist-bands, collars, etc.) are likely to be cooked into the fabric by boiling rather than loosened and washed out.

BOILING THE SOAP IS UNNECESSARY

Keep up suds by adding soap to each new lot of clothes.

Borax is a good water softener and bleaching agent and is not injurious to fabric. A tablespoon to a tub of water is sufficient. Soaking the wash in lukewarm water for a short period of time is advisable, as fabrics are expanded, thereby permitting a free action of the water in removing dirt.

Never soak clothes in hot water, as many stains are thereby set.

Washing Instructions

Be sure that drain valve "D" at the bottom of tub is closed. For capacity load fill the tub with hot water to line marked on Activator. For smaller loads reduce water level slightly to hasten washing. Water level, however, should never be less than 8 inches.

If the clothes have been soaked prior to washing, place them in the Extractor to remove this water before washing. This procedure will provide a means of determining the proper amount of clothes to wash at one time, as a full Extractor load is also a full load for the washer.

To start motor, shift Extractor "C" and Activator "B" control levers to "off" position, which is to the left; connect extension-cord plug to convenience outlet, and throw tumbler switch "A" to "on" position.

To start Activator, throw lever "B" all the way right until it locks. To stop, throw lever to left.

Add sufficient powder, chips or soap to give good washing results, but not enough to generate excessive suds in extractor only when drying clothes. Add water softener if necessary.

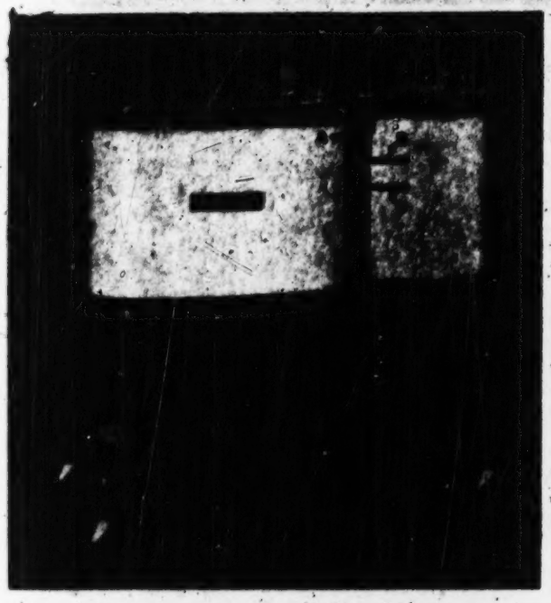
Place washing in the tub while the Activator IS IN MOTION. Distribute uniformly. Better results are obtained by washing smaller quantities of clothes for shorter periods of time than by operating the machine with large loads. The [illegible] will produce the same results in much less time.

The washing time required depends entirely upon the condition of the clothes. For proper washing action the clothes should be turning over freely in the wash.

Drying

When the washing of the first lot has been completed, stop the Activator.

Transfer the wash from the tub to the Extractor. Distribute clothes uniformly to assure even running of the Extractor. Push cloth down tight. Close cover over Extractor and start Extractor by throwing lever "C" all the way to the right. Allow Extractor to operate for three or four minutes (the



longer Extractor is run the drier clothes will be).

To stop Extractor throw lever "C" to left until it locks. The clothes are now damp-dry and ready for rinsing and bluing.

A second lot of clothes may be washed while the first lot is being dried in the Extractor. Damp-drying is usually completed in about one-half washing time, enabling the machine to spin-dry two loads to each washing load, if found desirable.

Pump

The drain is closed when lever "D" is to the right and open when to the left. In the closed position, water extracted from clothes will be removed from the Extractor tub and returned to the washer tub or into a set tub. The drain lever should remain in this position during washing and should be opened only when the washer tub is to be emptied.

After Washing

Shift control levers to "off" position.

Place the nozzle of the drain hose over the inverted tub-lid or some other receptacle, about a cupful of water will drain from the hose.

The porcelain tub is extremely easy to clean. Simply wipe the tube with a dry cloth after each washing. Lift the Activator and wipe inside and outside.

Do not cover the machine while any moisture is present. Lift out the extractor basket and wipe it dry as well as the tub.

Lubrication

The motor will need no oiling for two years in usual home use.

If the machine is used several hours each day, it should be oiled every three to six months.

The mechanism has been filled with lubricant at the factory and requires no further oiling.

Each week after the washing is finished and while you have the Extractor basket out to wipe the tub, place a few drops of oil in the hole in the top of the Extractor drive shaft.

Guarantee

This machine is guaranteed by the General Electric Company under terms of the guarantee certificate enclosed in the envelope attached to the washer.

We are happy to welcome you into the large and ever-growing family of General Electric Washer owners. We are sure that years of valuable service will result from such ownership. Please feel free to write to us at any time about your Home Laundry problems.

Home Laundry Equipment Section—
Merchandise Department

GENERAL ELECTRIC COMPANY
Bridgeport, Conn.

PART OF PLAINTIFF'S EXHIBIT 2.

601

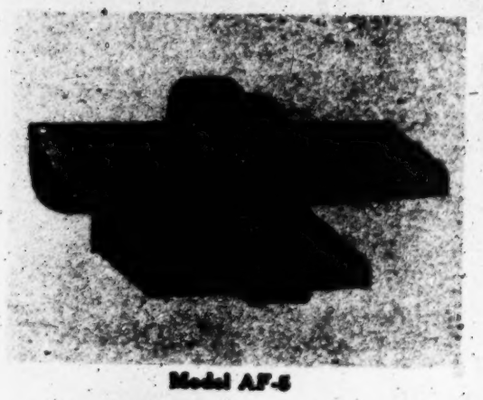
. . . BEGINNING

Model AW-23

Model AW-24

Model AW-23P

Model AW-22



Model AF-5

Model AW-21

Model AF-10

Model AW-44

Model AW-43P

Model AW-42

Model AW-41

The complete line also includes Double-tub Washer Models, Electric Dryers and Rotary Ironers.

General Electric Company, Merchandise Department, Bridgeport, Conn.

GENERAL ELECTRIC

PART OF PLAINTIFF'S EXHIBIT 2.

603

FEBRUARY 1935

The General Electric and Hotpoint Lines of Home Laundry Equipment Will Be

DESIGNED - STYLED - ENGINEERED

MANUFACTURED

AND

SERVICED

at the Bridgeport, Connecticut Works of the General Electric Company

This sensational new line of General Electric and Hotpoint Washers, introduced to the trade last August, has received excellent acceptance from the public. In fact, so great has been the demand for this new equipment that overtime factory production has only now caught up with the tremendous avalanche of dealer orders.

The new 1935 line of Home Laundry Equipment was styled, engineered and designed by the General Electric Company at its Bridgeport Works. Starting February 1st, the General Electric Bridgeport Works will also manufacture and service General Electric and Hotpoint Home Laundry Equipment.

Dealers will welcome this new centralized operation — the complete coördination of engineering, styling, manufacturing, sales promotion and service — all concentrated within a single unit. This impressive program will stimulate and increase volume sales of what are probably the fastest-growing lines of Home Laundry Equipment in America. It will also guarantee the traditional QUALITY so long associated with General Electric and Hotpoint products.

Progressive and wide-a-wake dealers, who join the parade of other successful General Electric and Hotpoint dealers, will cash in on this "Once-in-a-life-time" opportunity to secure increased volume together with steadily growing profits.

PART OF PLAINTIFF'S EXHIBIT 2.
605

GENERAL ELECTRIC

1939 FORM 1 ABANDONED BUREAU WARNER (D. EX. 9-A).

U.S.D.C. W.D.Mo.W.D.
In Equity 2892
Plaintiff's Supp. Ex. 5

U. S. D. C. W. D. Mo. W. D.
THE MAYTAG COMPANY
vs.
GENERAL ELECTRIC SUPPLY CORPORATION
IN EQUITY 2892
PLAINTIFF'S EXHIBIT 5C

PLAINTIFF'S EXHIBIT 5.

1900 FORM 3 ABANDONED RUBBOARD WASHER (D. EX 103).

PLAINTIFF'S EXHIBIT 6.
A. 609

U. S. D. C. W. D. Mich. W. D.

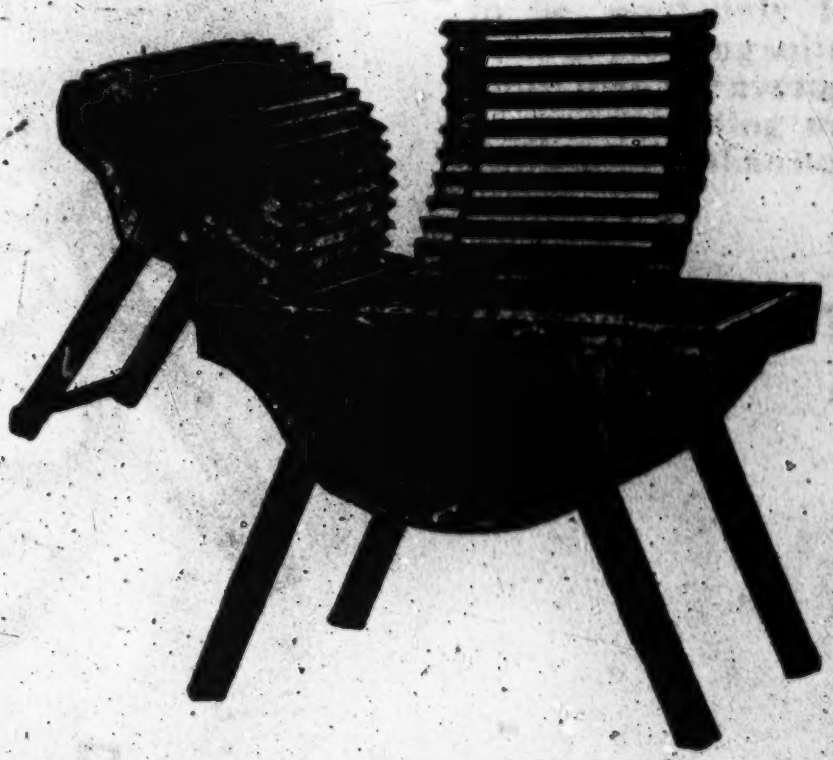
THE MAYTAG COMPANY

vs.

GENERAL ELECTRIC SUPPLY CORPORATION

In EQUITY 2892

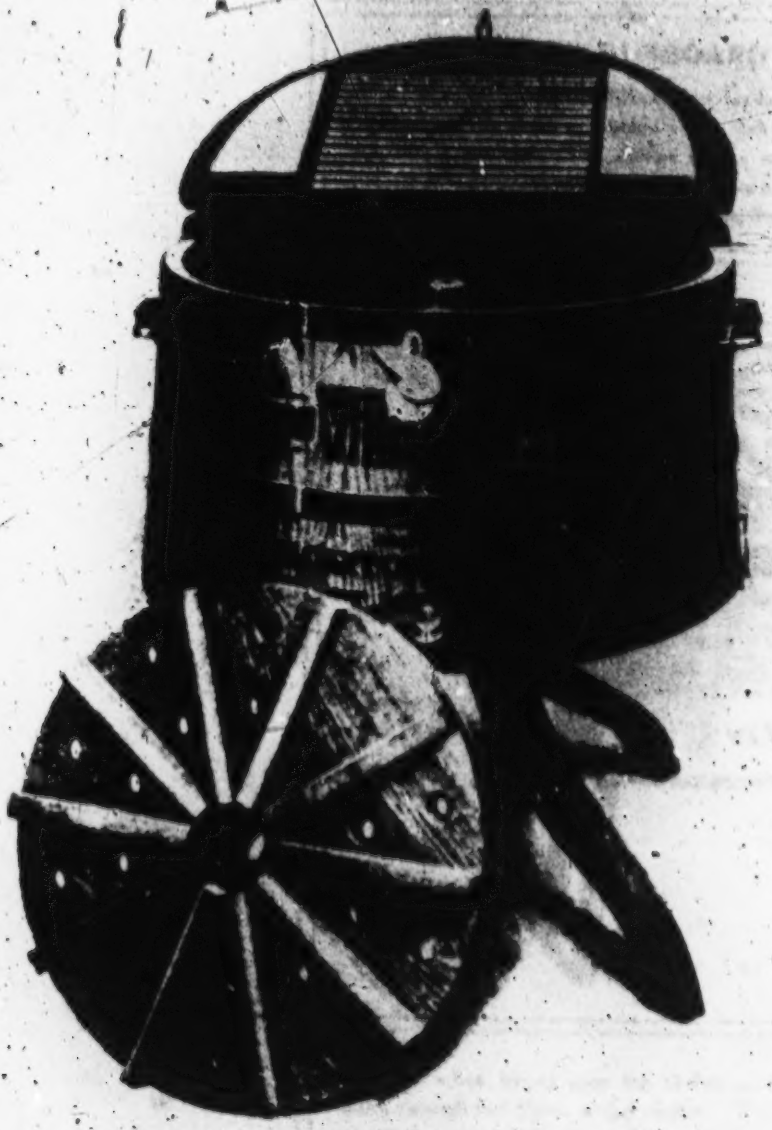
Pf DEFENDANT'S EXHIBIT 6



A.

A

PLAINTIFF'S EXHIBIT 6.
B.



Notice the patent washboard attachment on lid. This is to be used only for parts of clothing soiled more than the average to save operating machine longer than necessary.

B.

PLAINTIFF'S EXHIBIT 6.
C.
613

THE DIETZ RUBBOARD POWER WASHER

¶ This machine is especially adapted for washing fine garments and laces, but can also be used for ordinary clothes. The tub is the same high quality as used in the Prong machine. The dasher in this machine, you will notice, is a large circular rubboard, covering the entire circumference of tub. It has large nuckles which gently rub the clothes while carrying them through the water, the large holes

Insist on The Dietz — there is none just as good.

A Machine of Quality!

Thousands of Satisfied Users.

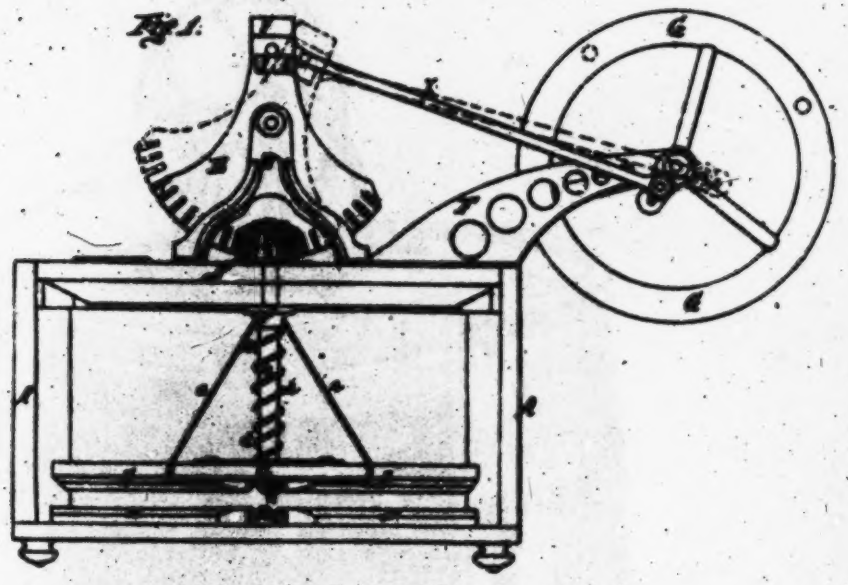
Save your Health, Time, Strength and Clothes

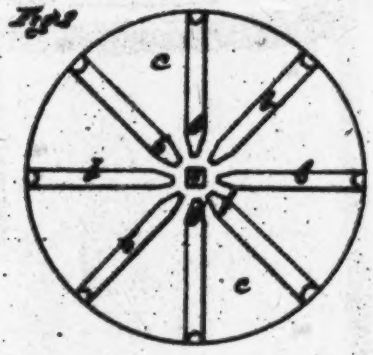
in dasher when forced upon the clothes cause a suction, forcing the hot soapy water through the fibers of the clothes. You do not have to pack the clothes against the sides of the Dietz Power Washer to get results. The dasher is supposed to do the work and therefore should come in contact with the clothes. The Dietz Power Washers, owing to their different construction, are guaranteed to wash the clothes cleaner, in less time, with less pressure than any other power washer on the market.

C.

PLAINTIFF'S EXHIBIT 6.

D.





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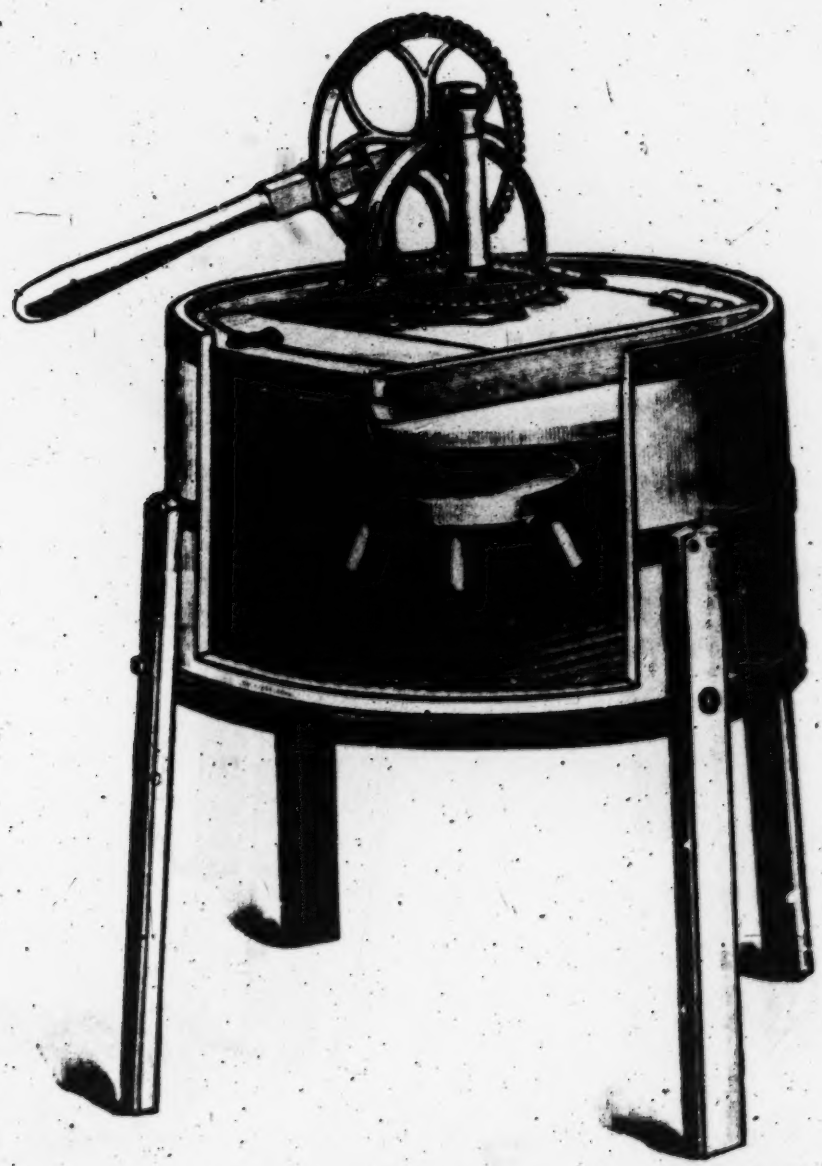
PLAINTIFF'S EXHIBIT 6.
E. 617



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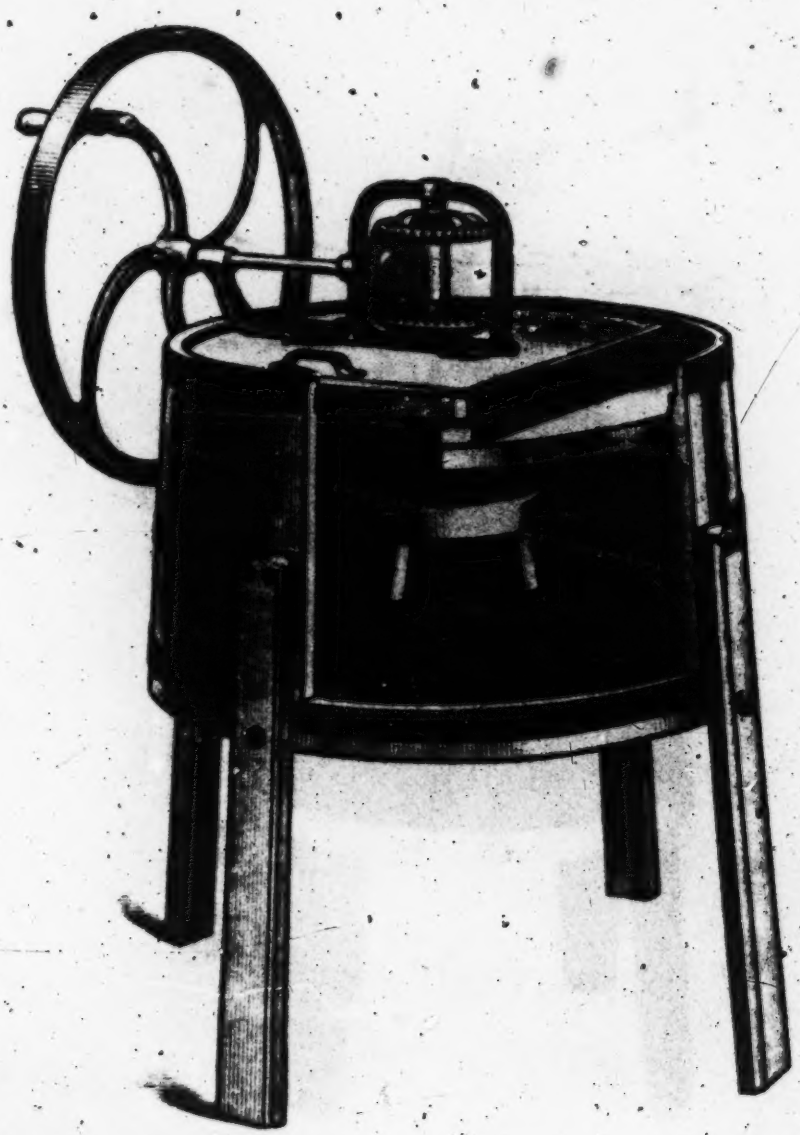
PLAINTIFF'S EXHIBIT 6. 619

F. 617



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PLAINTIFF'S EXHIBIT 6.

G. 621

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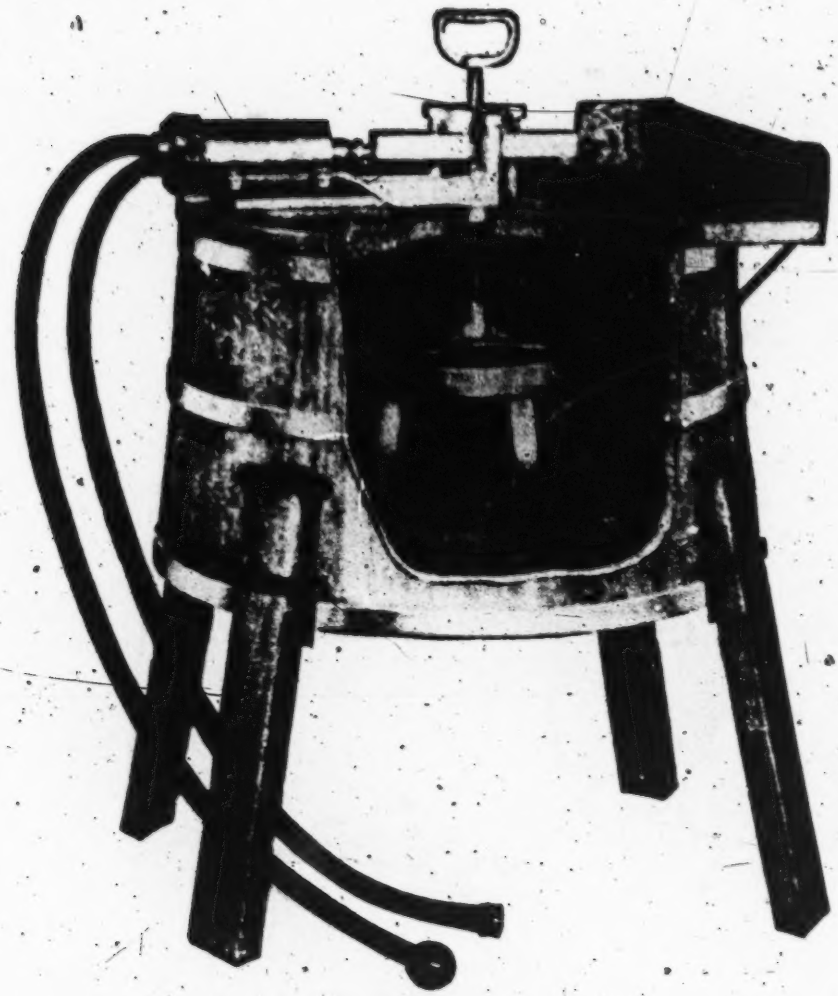
PLAINTIFF'S EXHIBIT 6.
H. 623



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PLAINTIFF'S EXHIBIT 6.

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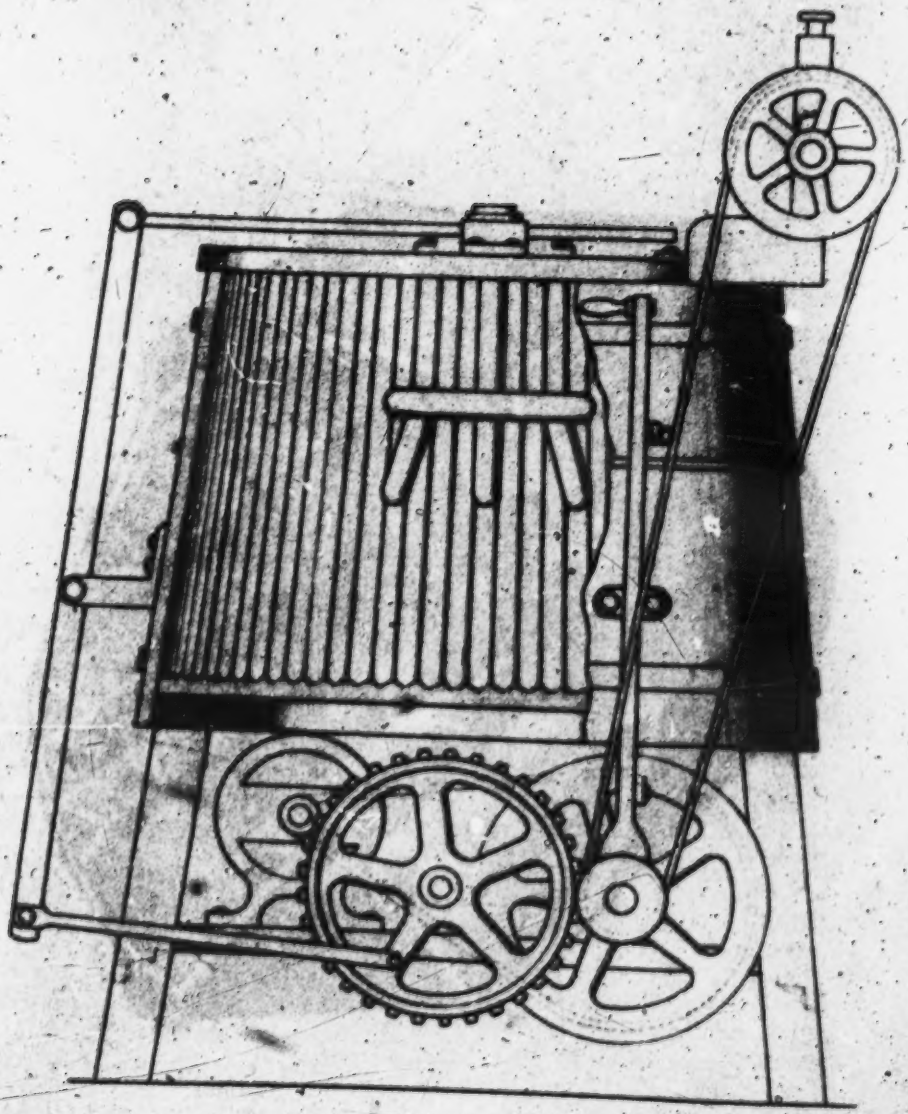

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PLAINTIFF'S EXHIBIT 6.
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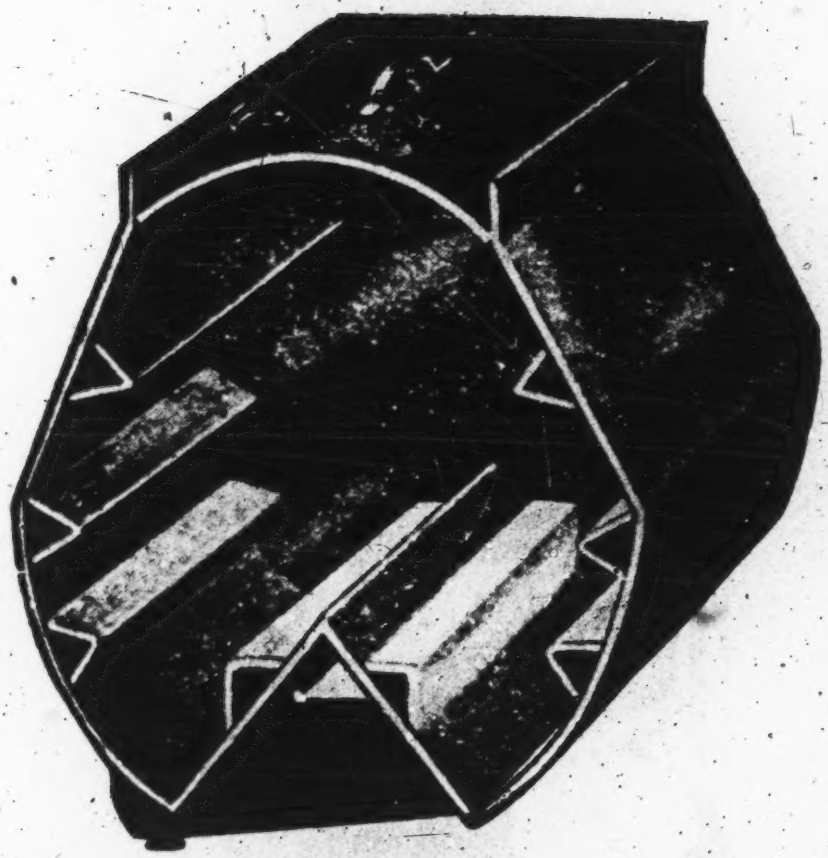

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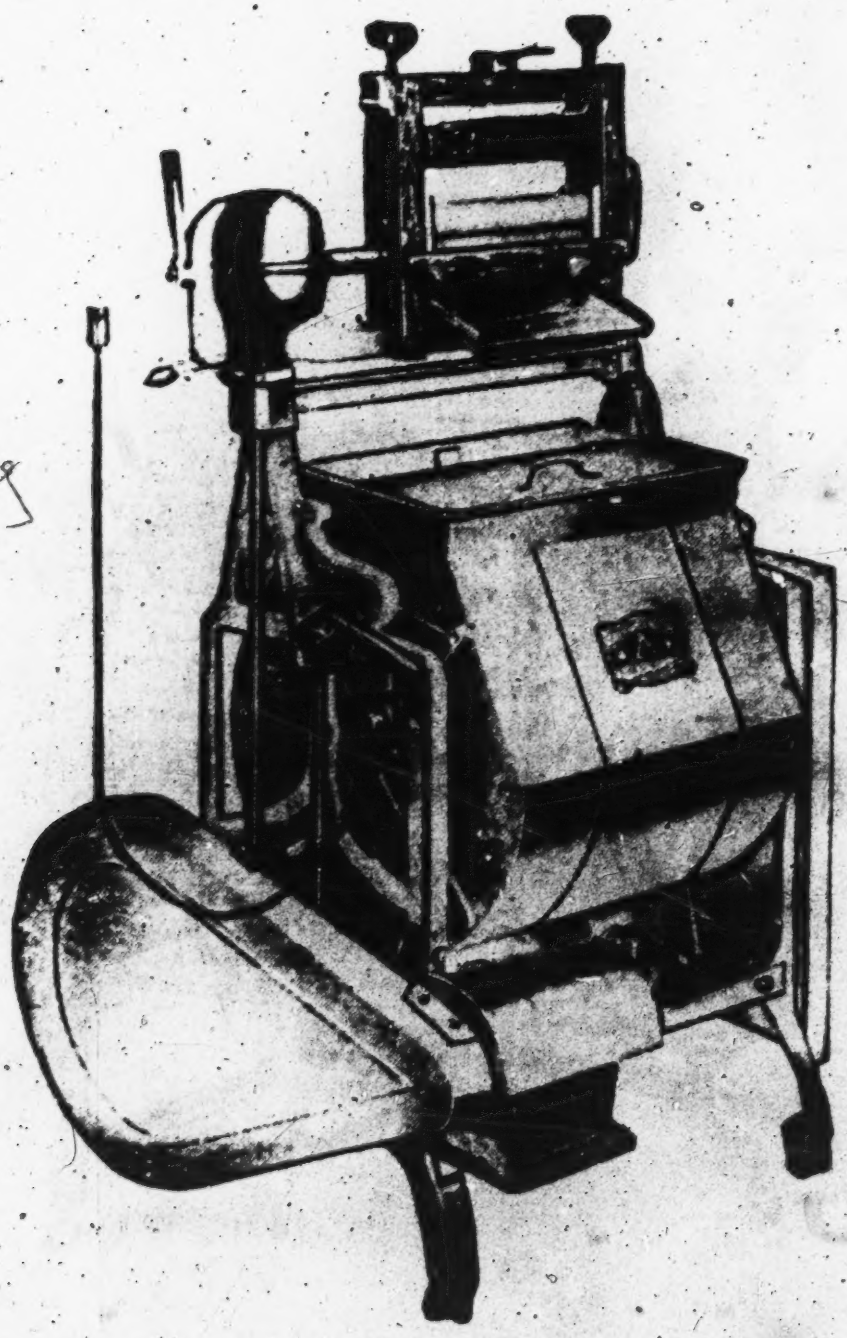
PLAINTIFF'S EXHIBIT 6.
K. 629



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PLAINTIFF'S EXHIBIT 6.

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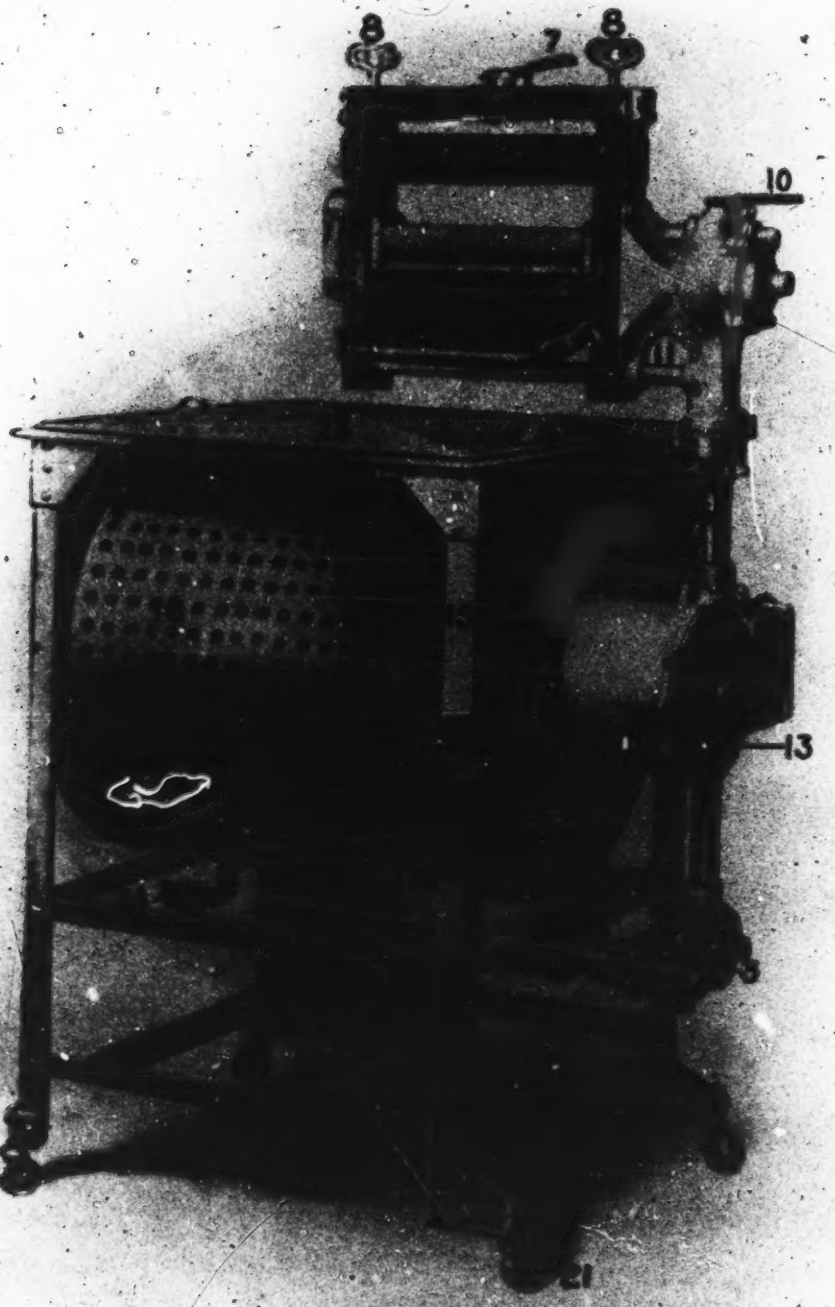

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PLAINTIFF'S EXHIBIT 6.

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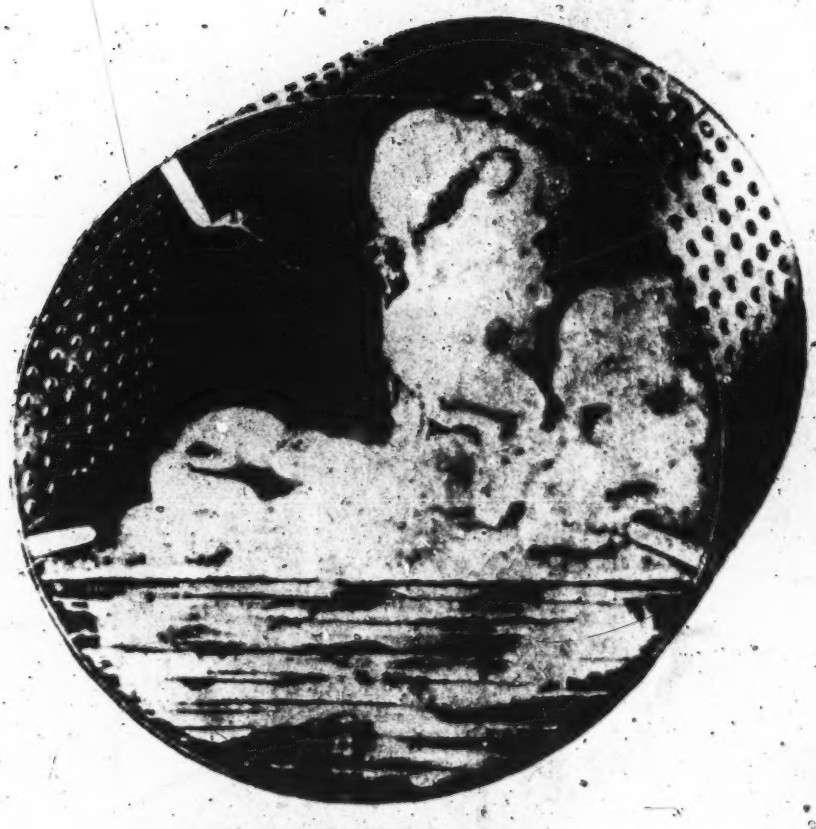

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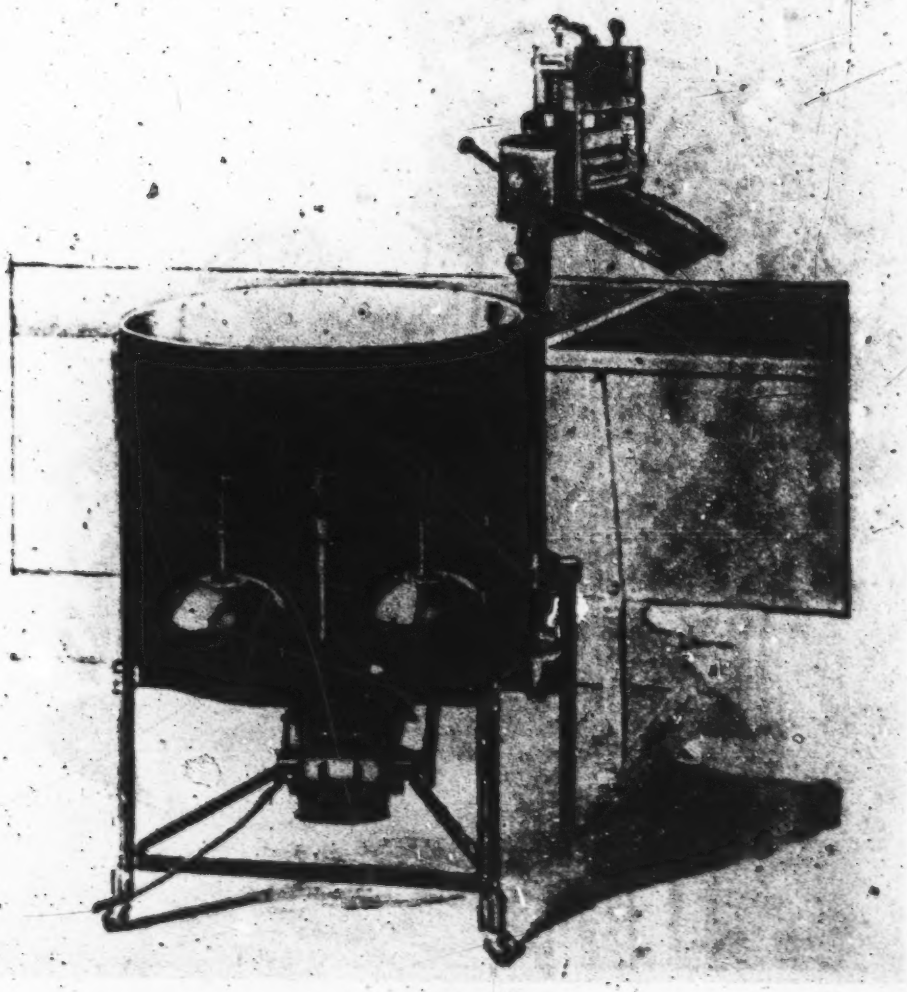
PLAINTIFF'S EXHIBIT 6.
N. 635



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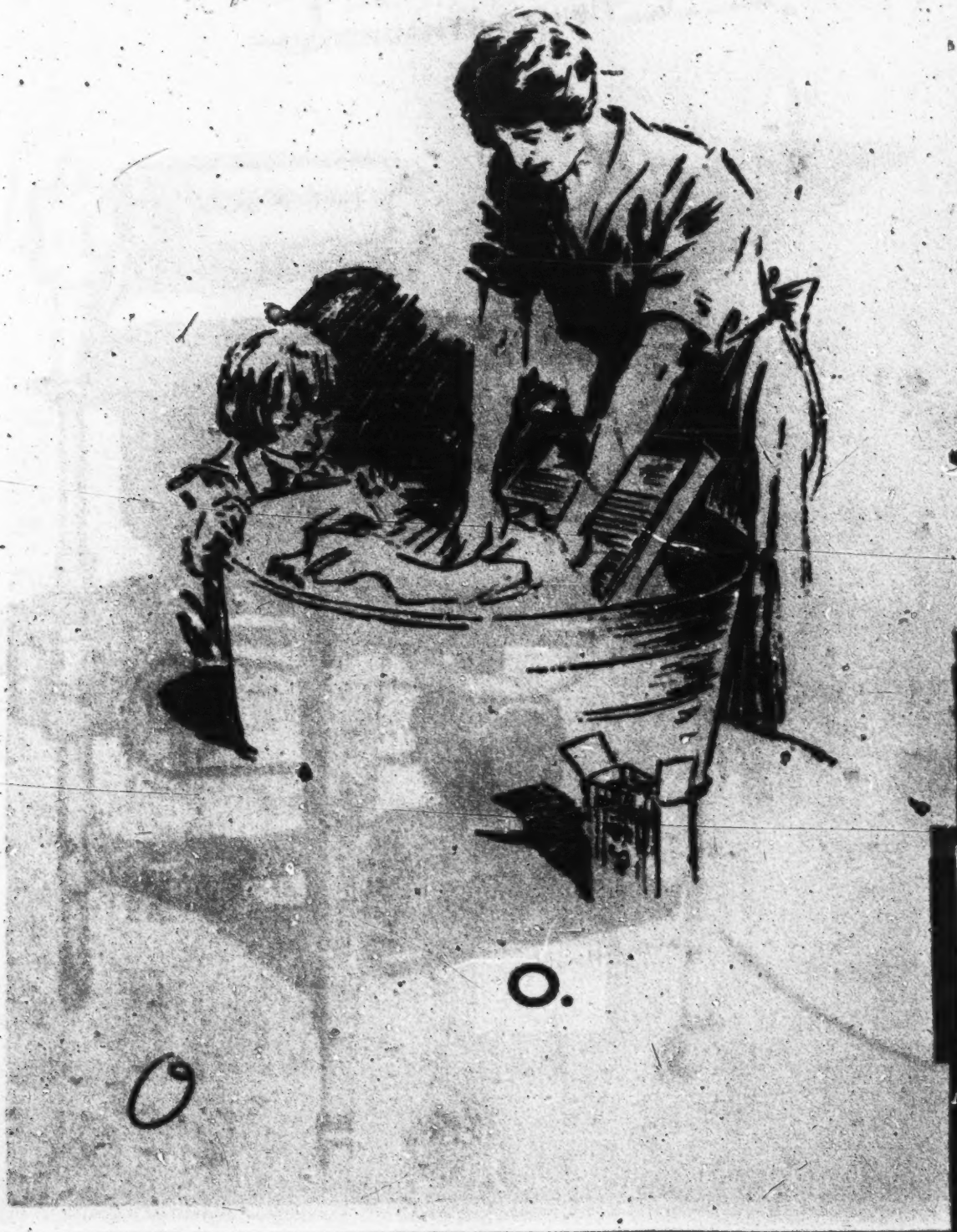
637

PLAINTIFF'S EXHIBIT 6.



637

PLAINTIFF'S EXHIBIT 7C.

W. D. Mo. W. D.

U. S. D. C.

639

THE MAYTAG COMPANY

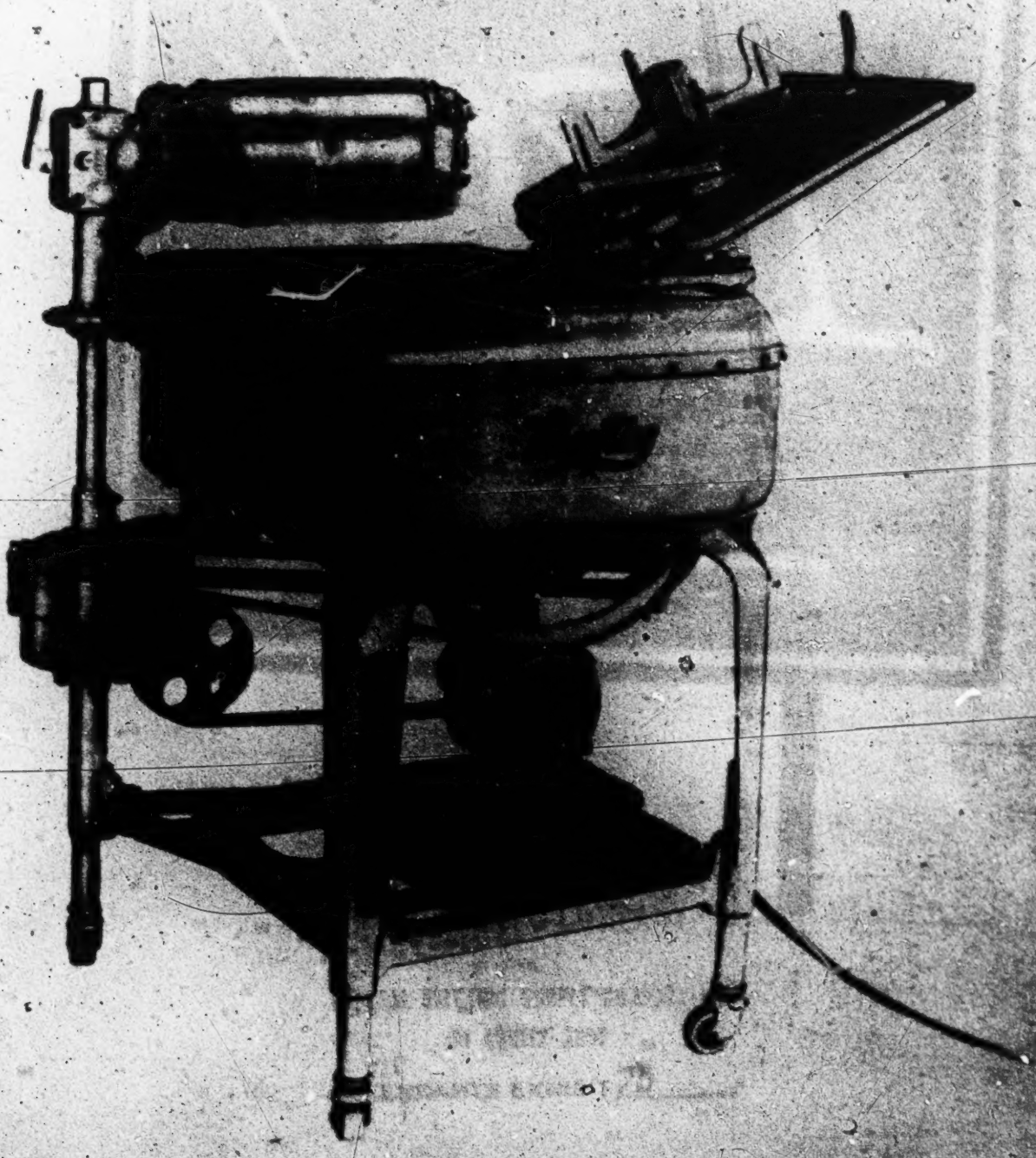
vs.

GENERAL ELECTRIC SUPPLY CORPORATION

IN EQUITY 2892

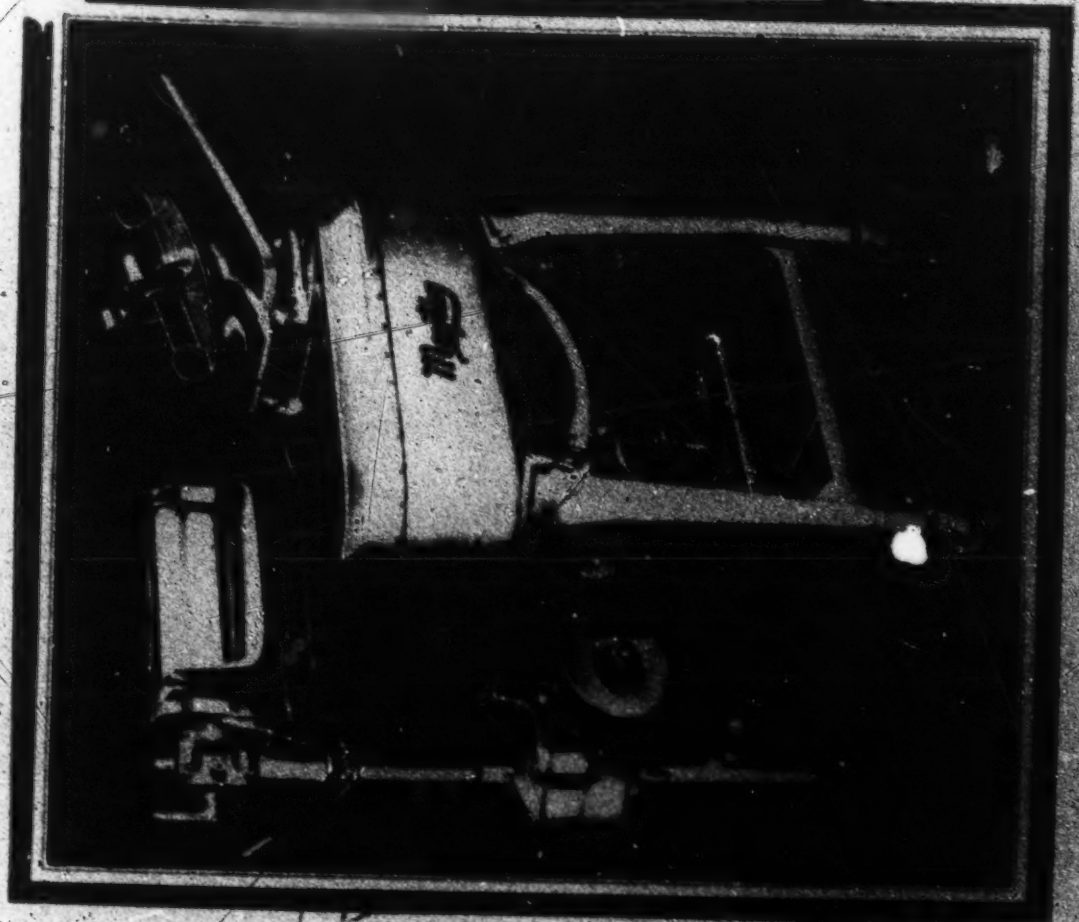
Pl

DEFENDANT'S EXHIBIT 7C



PLAINTIFF'S EXHIBIT 7 D.

641



U. S. D. C. W. D. Mo. W. D.

THE MAYTAG COMPANY

vs.

GENERAL ELECTRIC SUPPLY CORPORATION

IN EQUITY 2892

DEFENDANT'S EXHIBIT 7D

1059 (Plaintiff's Exhibit 9A.)

Plaintiff's Exhibit 9A is a copy of Fig. 1 of the Snyder Patent No. 1,866,779, in suit, as reproduced at printed page 563 supra, and is therefore omitted at this place in the printed record.

PLAINTIFF'S EXHIBIT 10 A.

643

10 a

U. S. D. C. W. D. Mo. W. D.

THE MAYTAG COMPANY

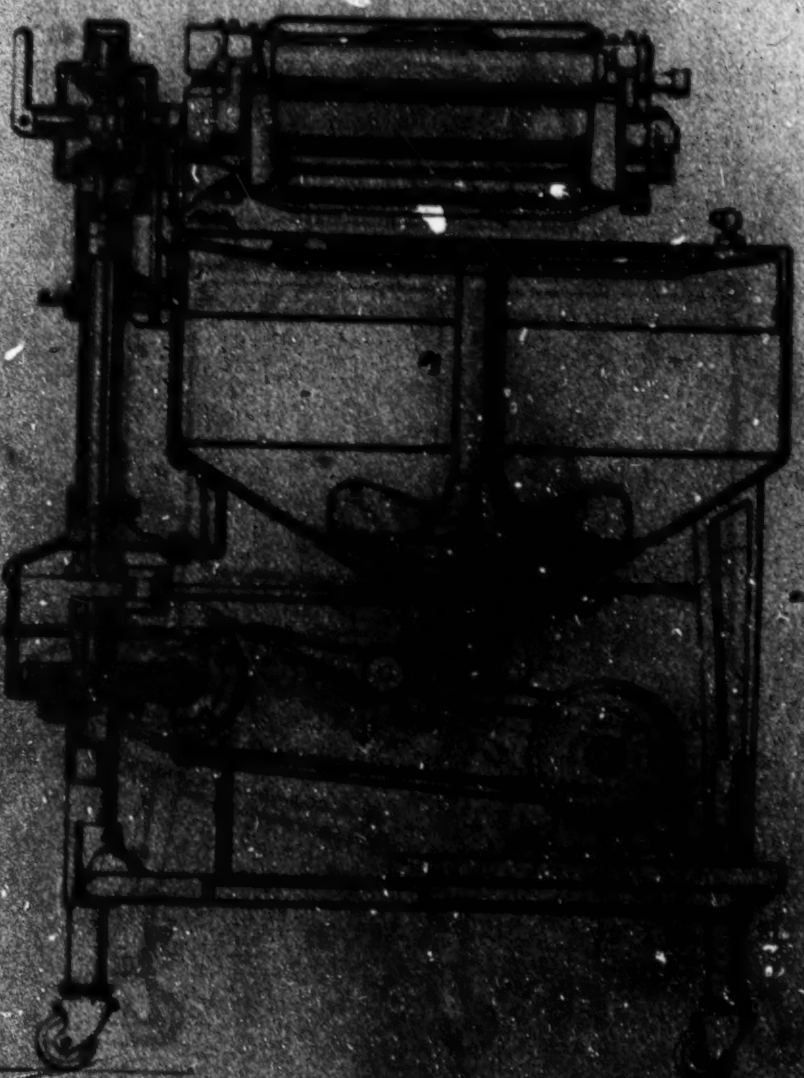
vs.

GENERAL ELECTRIC SUPPLY CORPORATION

IN EQUITY 2892

DEFENDANT'S EXHIBIT 10 a

MAYTAG GYRATOR
SNYDER
PATENTED WASHING MACHINE
SQUARE TUB



PLAINTIFF'S EXHIBIT 11 A.

U. S. D. C. W. D. Mo. W. D.

THE MAYTAG COMPANY

vs.

GENERAL ELECTRIC SUPPLY CORPORATION

IN EQUITY 2002

PLAINTIFF'S EXHIBIT 11 A

MAYTAG GYRATOR

SNYDER

PATENTED WASHING MACHINE

ROUND 1926

THE MAYTAG COMPANY

How "A Tempest in a Tub"

vs.

[redacted] ELECTRIC SUPPLY CORPORATION

[redacted] EXHIBIT [redacted] R

cleans clothes faster, better and more carefully

FOR many years washing machines have been in use. They have helped to lighten the work of washday. Maytag *Washing Machines* since the earliest days have been in the front rank. None have done better work. Yet we have felt that we had only begun to study the possibilities. For many years we have been experimenting to develop a principle that would wash everything with the thoroughness and carefulness of your own hands, yet with the speed of a machine. The goal has been reached. This idea came as quick as a flash during a series of experiments. The result is a water action that is past description. Words cannot describe it. Pictures cannot half portray it. It is a "Tempest in a Tub." Behind this action is

The GYRATATOR

A Wonderful Invention

THE *Gyrator* is the device that creates the [illegible] which is the secret of Maytag success. It is the only device like it, and no other washer can produce such water agitation.

When in motion it causes a revolution in the water that can only be described as "A Tempest in a Tub."

Gyrating currents of water are produced

[illegible]

[illegible]

READ INSIDE

The Tempestuous Action of the Water Does the Work in the New

Maytag Gyrafoam Washer

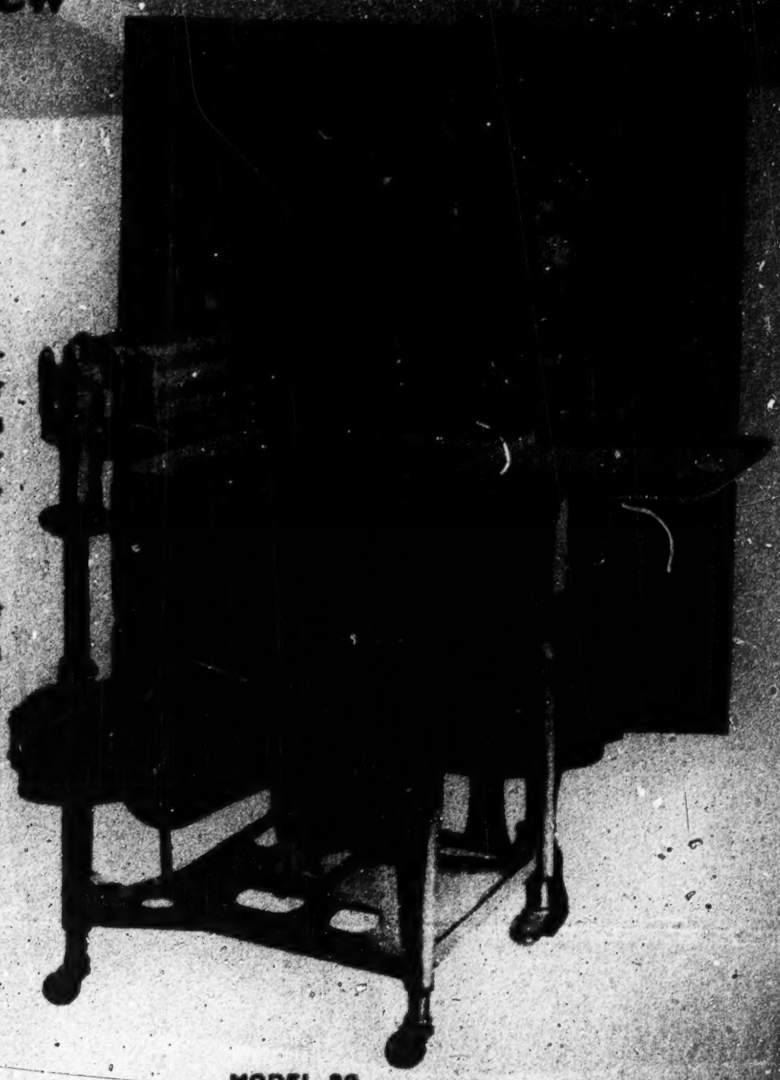
ALUMINUM

THIS new machine gets its name from the gyrating currents of water and soapy foam. It is not like any other type of washer. It is not a dolly machine. It is not a cabinet machine. It is not a vacuum or an oscillator machine. It is not like anything ever built. It is the only absolutely new principle of washing in the past ten years.

It cleans as no other principle can. See how it works. Water alone cleans your clothes. The gyrating currents of water gently flex and work the fabrics until the dirt is loosened. Then the turbulent action of the water carries the dirt free of the clothes.

You can clean a tubfull in half the time. If you want to wash a half tubfull of clothes, you use only a half tub of water. If you want to clean just a few pieces you use just enough water to cover them. And the results are remarkable.

It is beyond our power to describe the action of the water, its washing speed, its thoroughness and the care with which it handles even the most delicate things. You must see it yourself. You must lift up the lid while it is working and SEE the action. Then you will understand.



MODEL 80
GYRAFOAM ELECTRIC WASHER

A Cast Aluminum Tub

The tub of the new MAYTAG *Gyrafoam Washer* is made of cast aluminum. It will not rot, rust, corrode, swell, warp or split. It is self-cleaning. It is light, yet has life-time durability.

The shape of the tub makes it easy to work with. There is no machinery exposed. Everything is housed in. The lid is absolutely free of mechanism or obstructions.

Everyone who has used this new washer says it is the easiest washer to work with they have ever seen.

See a Demonstration—You, Too, Will Marvel!

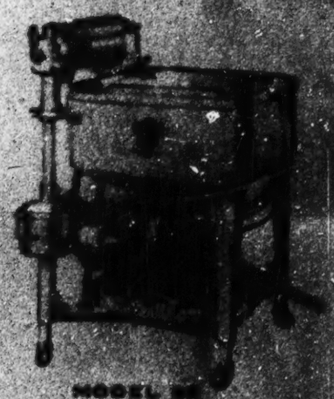
There is only one way you can realize what a wonderful improvement the new MAYTAG *Gyrafoam Washer* is—YOU MUST SEE IT.

You must see the wonderful action of the water. Nothing like it has ever been seen before. You must hear the gurgling, watery, washing sound.

Come in our store. We have a machine on display. We will demonstrate it for you. See for yourself the action that is astounding washing experts. Learn why it is called "A Tempest in a Tub."

Famous Maytag All Metal Divided Wringer

Unquestionably the most highly perfected power wringer. All metal except the rollers. Low design, easy to reach over. Wringer turns hand and forward. Adjustable to five positions. Automatic tilting down plate. Lightning-quick tension release. An exclusive MAYTAG invention.



MODEL 60

For country homes not having electricity the MAYTAG *Gyrafoam Washer* is equipt with the famous MAYTAG Multi-Motor which operates on gas or gasoline.

PLAINTIFF'S EXHIBIT 11 C.

An Airplane View of the New Maytag Gyrafoam Washer Showing the Remarkable Agitation of the Water

Your eyes can SEE that it cleans

Your ears can HEAR that it cleans

Your good sense tells you that it MUST clean

The Biggest Sensation in Washing Machine History—the New

Maytag Gyrafoam Washer

ALUMINUM

Here you see the new Maytag creation—the result of a lifetime in the business—the masterpiece of all. It is not a dolly type. It is not a cylinder type. It is not a vacuum or oscillator type. It is not any other type that you have ever seen. It is new. It is different. In operation, it is unlike anything ever built.

Yet it contains the one long-sought feature, we believe—the true washing action produced by water alone.

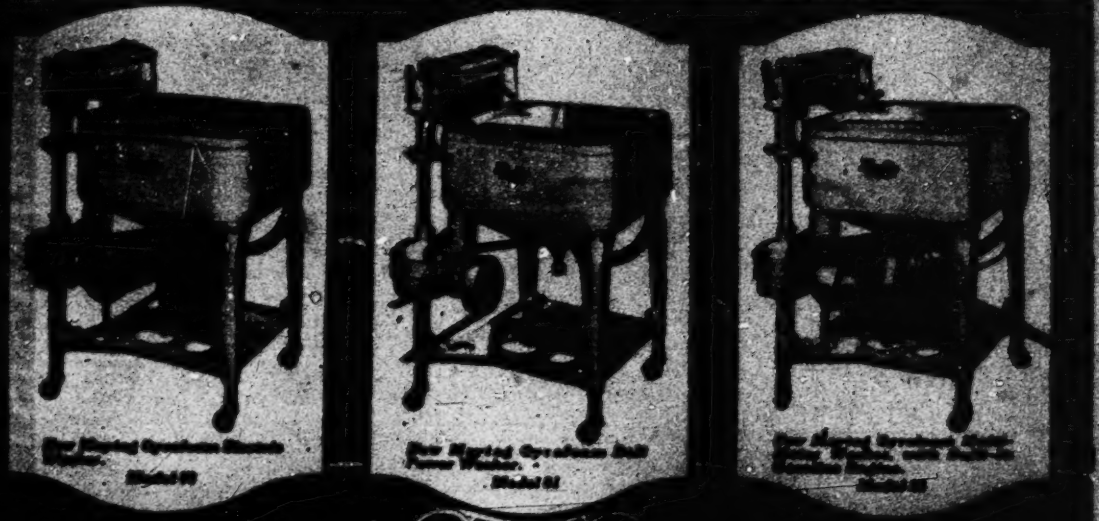
The gyrating currents of foaming water, stirred into great activity by the unusual action of the GYRATATOR, flex and clean the clothes as no other principle can. The turbulent action of the water washes the dirt away and leaves the fabric perfectly clean.

This remarkable water action is indescribable. No words—no theoretical charts—can picture it. You must see it. You must open up the lid and look in. Then you will understand why we say it insures—

Faster Washing
Cleaner Washing
More Careful Washing

The Maytag Gyrafoam Washer is a combination of water-driven washing and rolling action. The tub is entirely [illegible] ALUMINUM, to prevent rust, stain, smell, rust or corrosion. It is [illegible]. It is light, yet [illegible] strong. Other [illegible] than [illegible] [illegible]

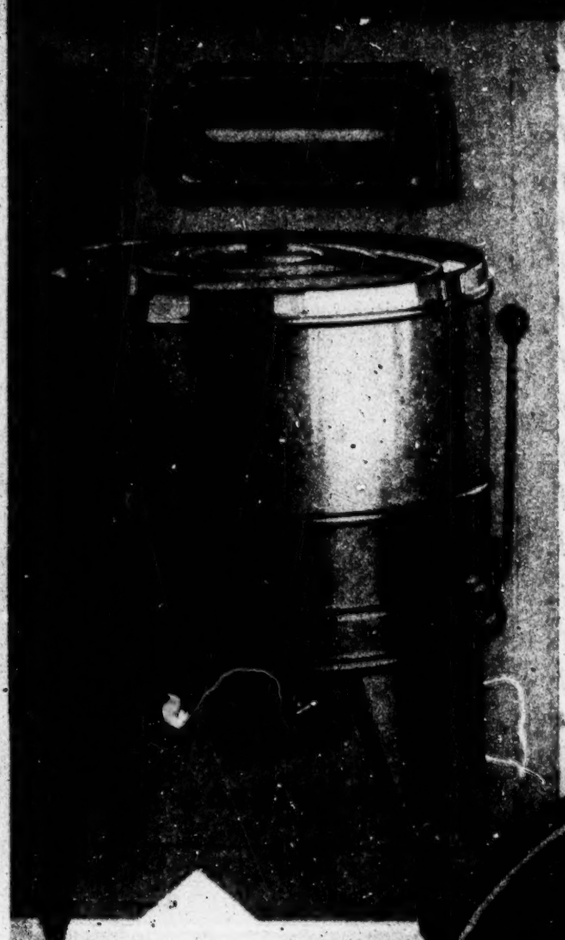
other machine of the same capacity. The cylinder is hollow, resulting in lift and [illegible] with the [illegible] [illegible] [illegible]



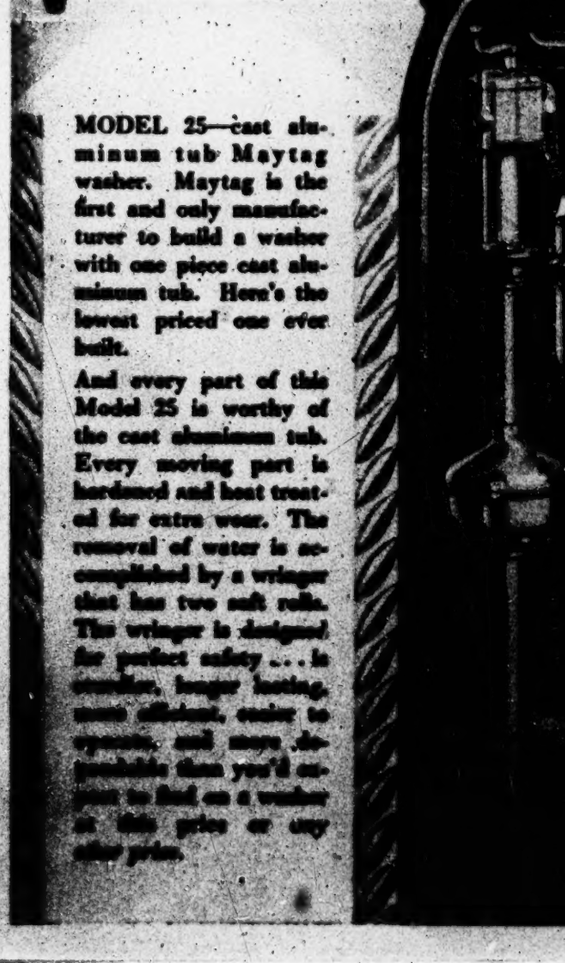
The Maytag Company, N...

11 D

MAYTAG QUALITY

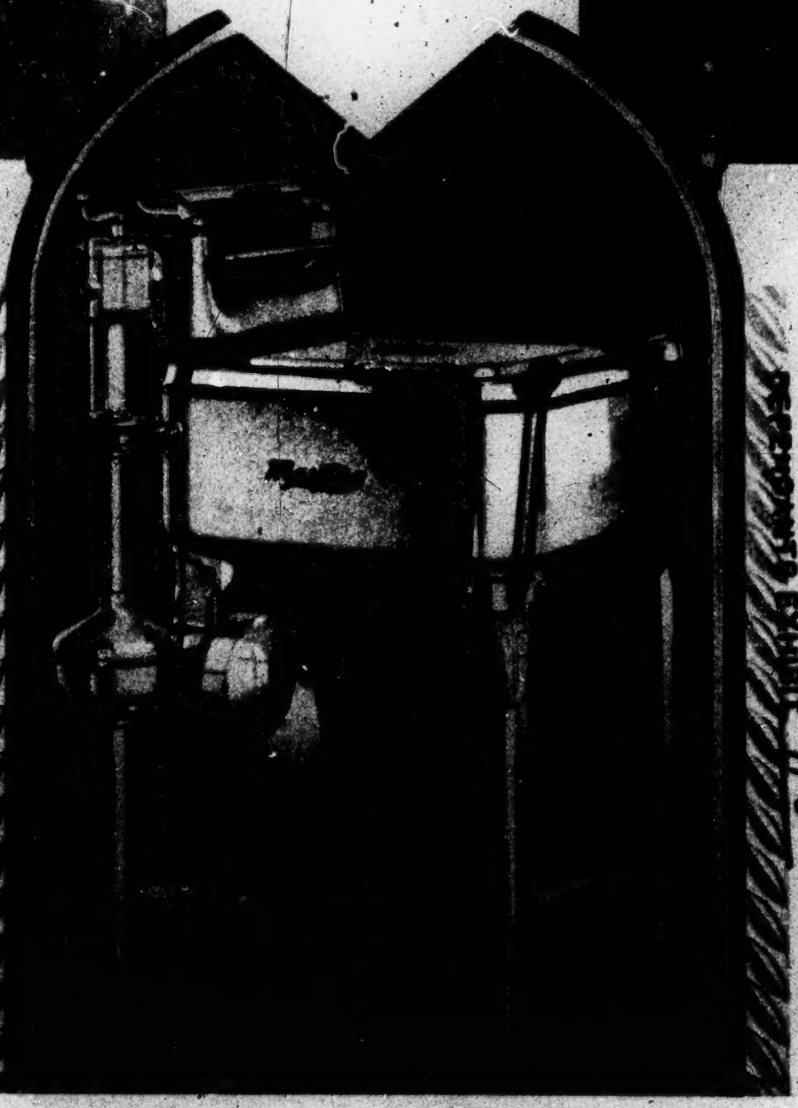


MODEL A—the washer that brought world leadership to Maytag. And not even Maytag has ever built a finer washer. The tub (four gallons oversize) is cast in one piece from *aluminum*—lifetime aluminum, the *best* material known for a washer tub. The Roller Water Remover with its firm and soft rolls, its safety feed, reversible drain and many other exclusive features of superiority cannot be duplicated on *any other washer* made. Yet that is but *one* of the reasons why the Model A is known as the World's Finest Washer. You have only to *see* this Maytag to realize its superiority.



MODEL 25—cast aluminum tub Maytag washer. Maytag is the first and only manufacturer to build a washer with one piece cast aluminum tub. Here's the lowest priced one ever built.

And every part of this Model 25 is worthy of the cast aluminum tub. Every moving part is hardened and heat treated for extra wear. The removal of water is accomplished by a wringer that has two soft rolls. The wringer is designed for perfect safety . . . is smoother, longer lasting, more efficient, easier to operate, and more dependable than you'd expect to find on a washer at this price or any other price.



MODEL 15—the lowest priced washer ever built to Maytag quality standards. Tub of Platinum Gray [illegible] the same material as the most expensive [illegible] of other makes. [illegible] to start and stop [illegible] while motor is running. [illegible] to stop, [illegible] the wringer [illegible] other quality features.

Don't let the low price of this washer [illegible] you to its quality. It's a high grade washer in every respect—built the Maytag way, with quality you can see and more quality in the parts you can't see—unquestionably a superlative value for the price.

PLAINTIFF'S EXHIBIT 11 D.

681

PLAINTIFF'S EXHIBIT 11 D.
663

MAYTAG

make
MAYTAG
the soundest washer value

NOT just "selling points," but actual, downright quality is built into every Maytag washer. Experience-tested features . . . refinements and improvements on every smallest hidden part . . . exacting standards of materials and workmanship . . . rigid inspections of every part and assembly . . . these all go together to put the Maytag washer in a class by itself. And they account for the fact that Maytag is known for highest quality in practically every country in the world.

DIRECTIONS

FOR OPERATING

Maytag Gyrafoam Washer

THE MAYTAG COMPANY

THE MAYTAG COMPANY

Before putting water in the tub for washing, carefully oil the machine as directly indicated on illustration.

Where to Oil the Aluminum Electric Washer

1—Hand oil pressure cups; one turn each washing. USE ONLY GOOD GRADE OF CUP GREASE OR VASELINE.

2—End bearing on electric motor; high grade of lubricating oil; three or four drops each washing.

3—Power shaft bearing; two or three drops each washing.

4—Worm gear case; one tablespoon full automobile crank case oil every fourth washing.

5—For lower end of wringer drive shaft and crank thru pipe casing; four or five drops each washing.

6—Upper end of wringer drive shaft thru nickel plated cap; three or four drops each washing.

7—Wringer shaft bearing; one or two drops each washing.

8—Roller bearings for wringer roll's both ends. Release the wringer, turn upper roll back and put a few drops in the cavity of each ball bearing every second or third washing.

9—Friction for drain board reverse; oil each washing.

10—Wringer post; one drop every two or three washings.

A—Wringer control lever.

B—Wringer safety release.

C—Wringer release lever.

D—Operating lever.

PLAINTIFF'S EXHIBIT 112

A Comparison With Other Principles

The operation of this machine is so different from any other washer that a few suggestions regarding its operation may not be out of order.

As a comparison,—the dolly machine with its four pegs groups the center portion of the clothes in such a way that some of the clothes get quite an agitation while others get practically nothing until they work themselves away from the dolly.

On a cylinder machine the clothes on the outside of the roll get more agitation than the clothes in the center until they work themselves toward the outside.

A vacuum machine works on a few surface clothes while those in the bottom go free. So we might go through the entire list explaining the different methods used in washing.

In the new Gyrafoam Washer the point we wish to bring out to insure you a better understanding of the machine is that it throws the clothes apart and washes all pieces alike.

DIRECTIONS FOR OPERATING

FOLLOW CLOSELY

FIRST: Oil the machine carefully.

SECOND: Fill the tub with hot water to within two or three inches of the top. Put in the soap and run the gyrator until the soap is thoroughly dissolved.

THIRD: WITH THE GYRATOR STILL RUNNING put in the clothes PIECE BY PIECE as long as the water rolls over them freely. The washing efficiency depends upon getting a free action of the water over the clothes.

Do not go by any directions as to how many clothes to put in at a time. You yourself are the best judge as you can easily tell if there is a free action that will carry the clothes over and over. For instance, if eight sheets are to be washed, they may be washed quicker and more thoroughly by dividing them and washing four at a time.

Never wash lace curtains or cloth of fine texture with quilts or rugs or other heavy articles, but wash them separately or with light clothes. Two or three minutes will usually be long enough to clean them.

Be sure to use plenty of water and soap.

Do not wash the clothes longer than necessary to clean them which you will find from two to eight minutes, depending upon how badly they are soiled.

Do not put clothes in the tub first and pour water in on them, but put water in first, start the gyrator, then put in the clothes piece by piece. THIS IS IMPORTANT!

Do not drain the water out when there are clothes in the tub.

The operator will not have time to wash the dishes or make the beds while the machine is cleaning the clothes. A little experience will surprise you how quickly the washing is done.

The Maytag Gyrafoam will clean more clothes in one hour than most other machines will do in two hours or longer.

When draining the tub, allow the machine to operate and when the soapy water has all run out, throw in a bucket full of clean water, let your machine run and you will be surprised to see how little wiping is necessary to clean the tub.

Unless you wish to observe the operation of the machine it is advisable to keep the lid of the machine closed to preserve the heat.

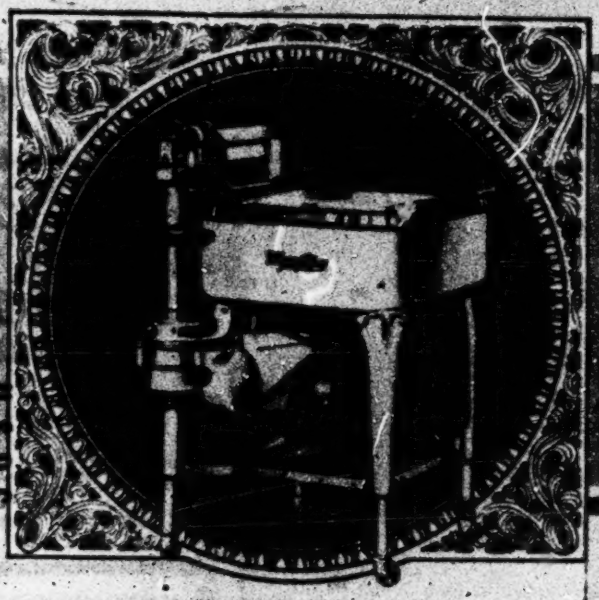
Wishing you happiness and success with your new Gyrafoam washer, we are

THE MAYTAG COMPANY

NEWTON, IOWA

PLAINTIFF'S EXHIBIT 11 E
662

11 7



The Maytag Will Sell Itself to You

THE astounding sales records of the MAYTAG—which are growing more phenomenally greater month by month—are due solely to the ability of the MAYTAG to *Sell Itself in Service.*

By the MAYTAG "Self-Sale" plan, the washer is brought to your home where you wash with it—in comparison if you choose with any or all other washers. You put it to the hardest test you know. Then, if it sells itself to you as the finest washer you have ever seen, as an almost unbelievably efficient laundry aid, you will want to retain it—if it does not sell itself to you, don't keep it.

F. L. MAYTAG, *Founder*
THE MAYTAG COMPANY, *Newton, Iowa*

Maytag

THE MAYTAG COMPANY

W. D. No. W. C.

vs.

GENERAL ELECTRIC SUPPLY CORPORATION

IN EQUITY 2892

P

DEFENDANT'S EXHIBIT 11 F

PLAINTIFF'S EXHIBIT 12 A.

12 A 671

U. S. D. C. W. D. Mo. W. D.

THE MAYTAG COMPANY

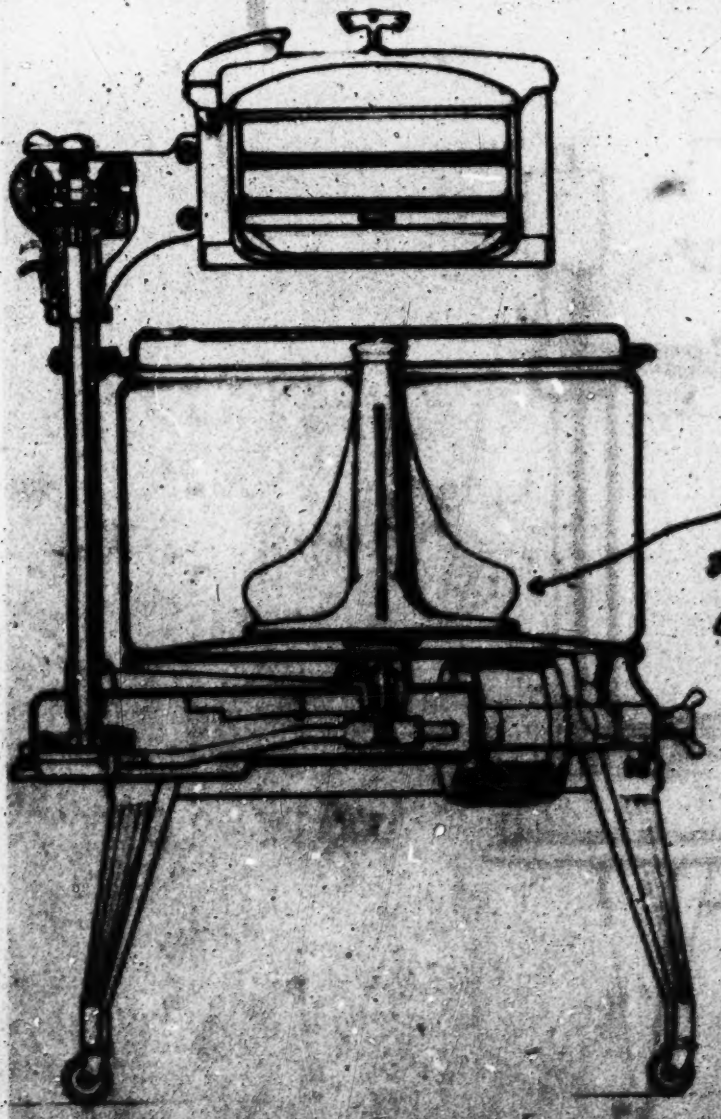
vs.

GENERAL ELECTRIC SUPPLY CORPORATION

IN EQUITY 2892

DEFENDANT'S EXHIBIT 12a

DEFENDANTS ACTIVATOR WASHING MACHINE CHARGED TO INFRINGE ROUND TUB



This point projects approx. 3/4" beyond disk.

PLAINTIFF'S EXHIBIT 12 B.

673

~~E. S. D. C.~~ W. D. Mo. W. D.

1 v B

THE MAYTAG COMPANY

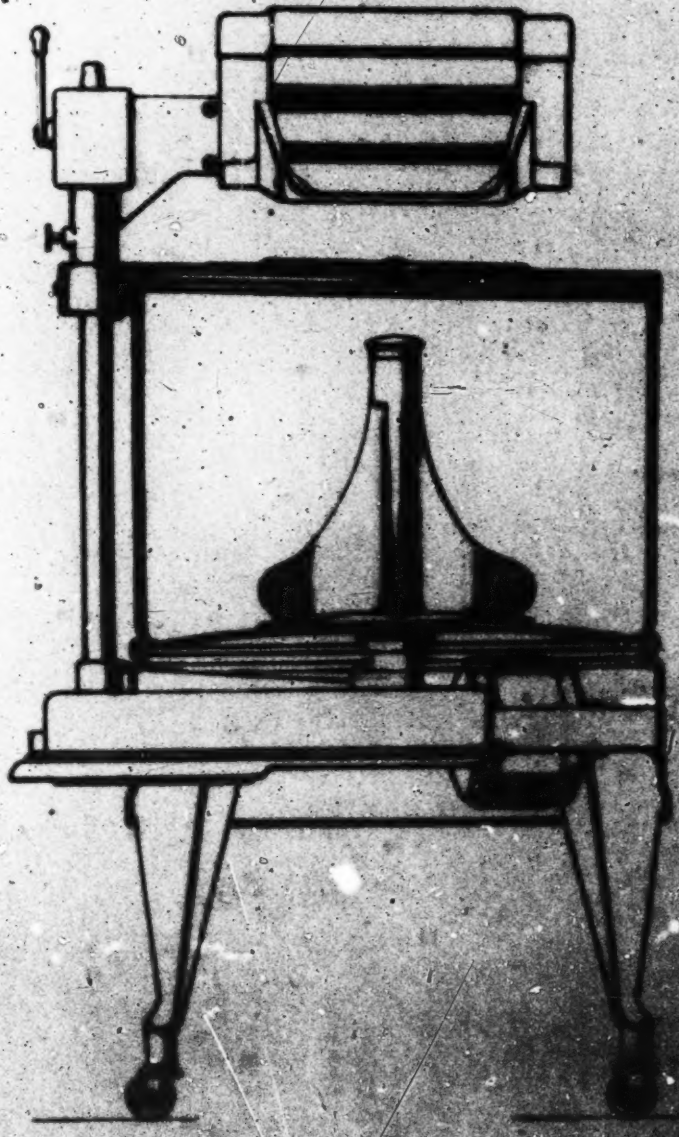
vs.

GENERAL ELECTRIC SUPPLY CORPORATION

IN EQUITY 2692

~~DEFENDANTS~~ Pf EXHIBIT 1 & 13

DEFENDANTS ACTIVATOR
WASHING MACHINE
CHARGED TO INFRINGE
SQUARE TUB



1078 (Plaintiff's Exhibit 13.)

Letters Patent No. 1,209,893 to H. F. Snyder, December 26, 1916.

Plaintiff's Exhibit 13, a copy of Snyder Patent No. 1,209,893, is omitted at this place in the printed record inasmuch as it is reproduced as a part of Defendant's Exhibit 13 at printed page 1111

1079 (Plaintiff's Exhibit 14, Letters Patent No. 1,644,959 to H. F. Snyder, October 11, 1927.)

[illegible] 11, 1927. 1,644,9[illegible]

H. F. SNYDER

WASHING MACHINE

Filed June 16, 1921 5 Sheets-Sheet 1

Fig. 1.

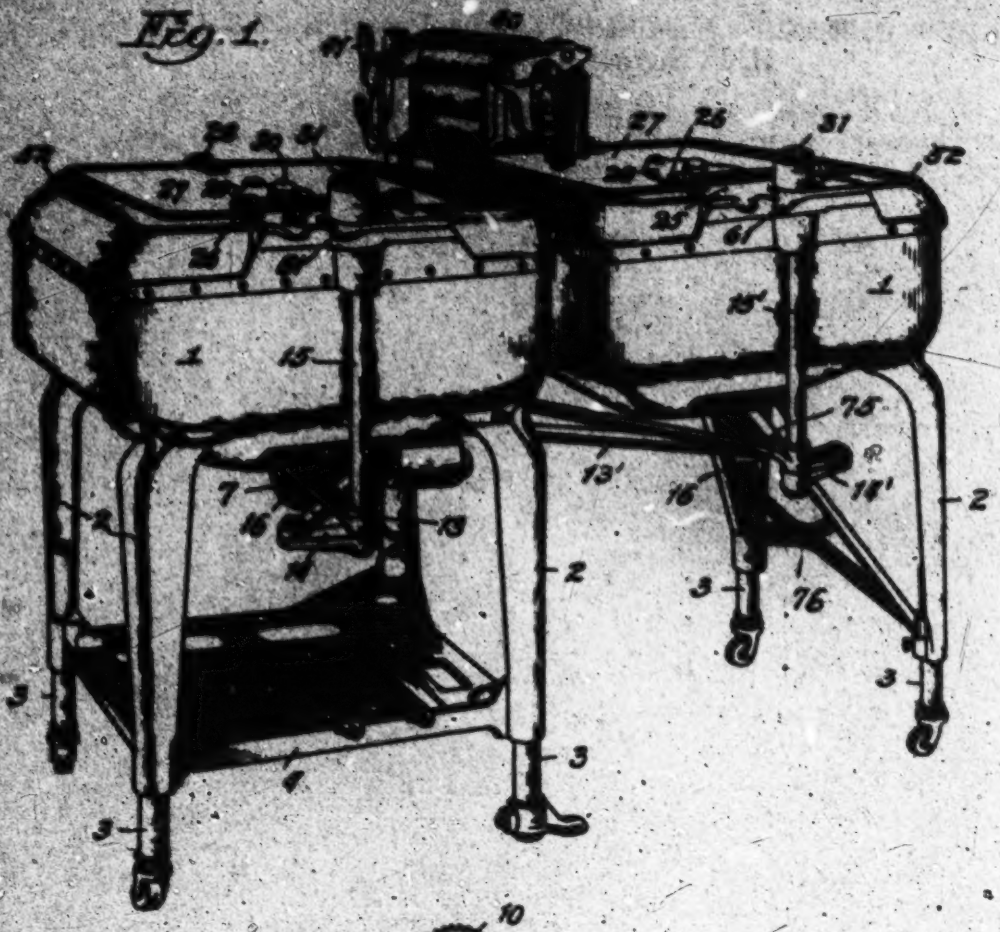
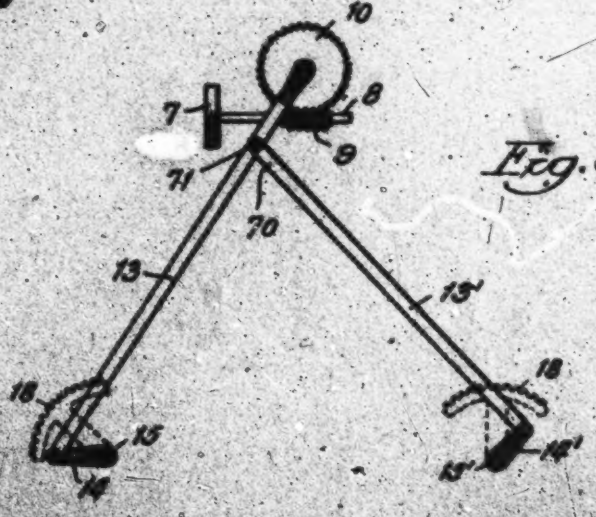


Fig. 8.



Witness:
John Enders

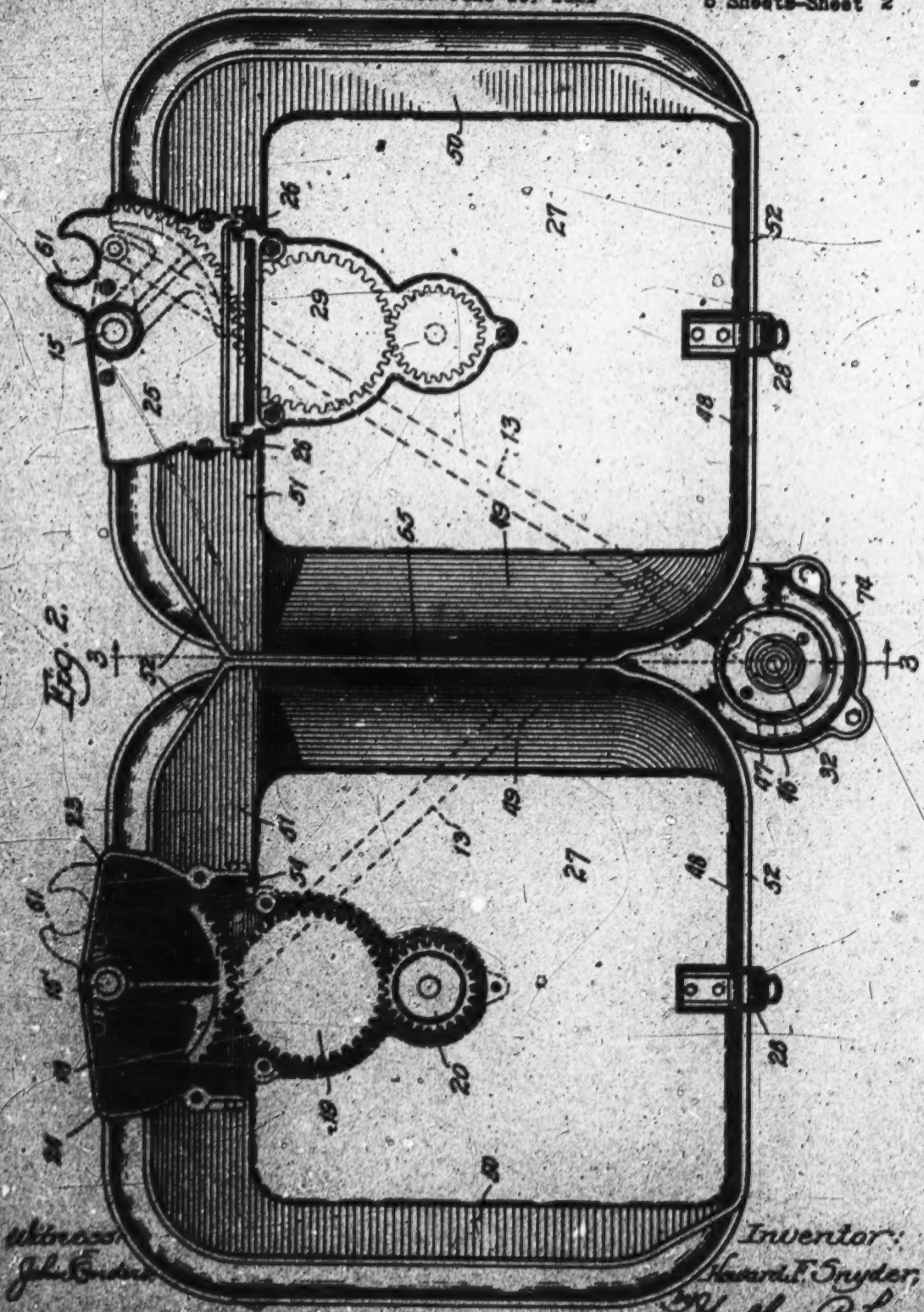
Inventor:
Howard E. Snyder.
By Wallace & Lane
Atty.

678 Oct. 11, 1927. 1,644,959

H. F. SNYDER

WASHING MACHINE

Filed June 16, 1921 5 Sheets-Sheet 2



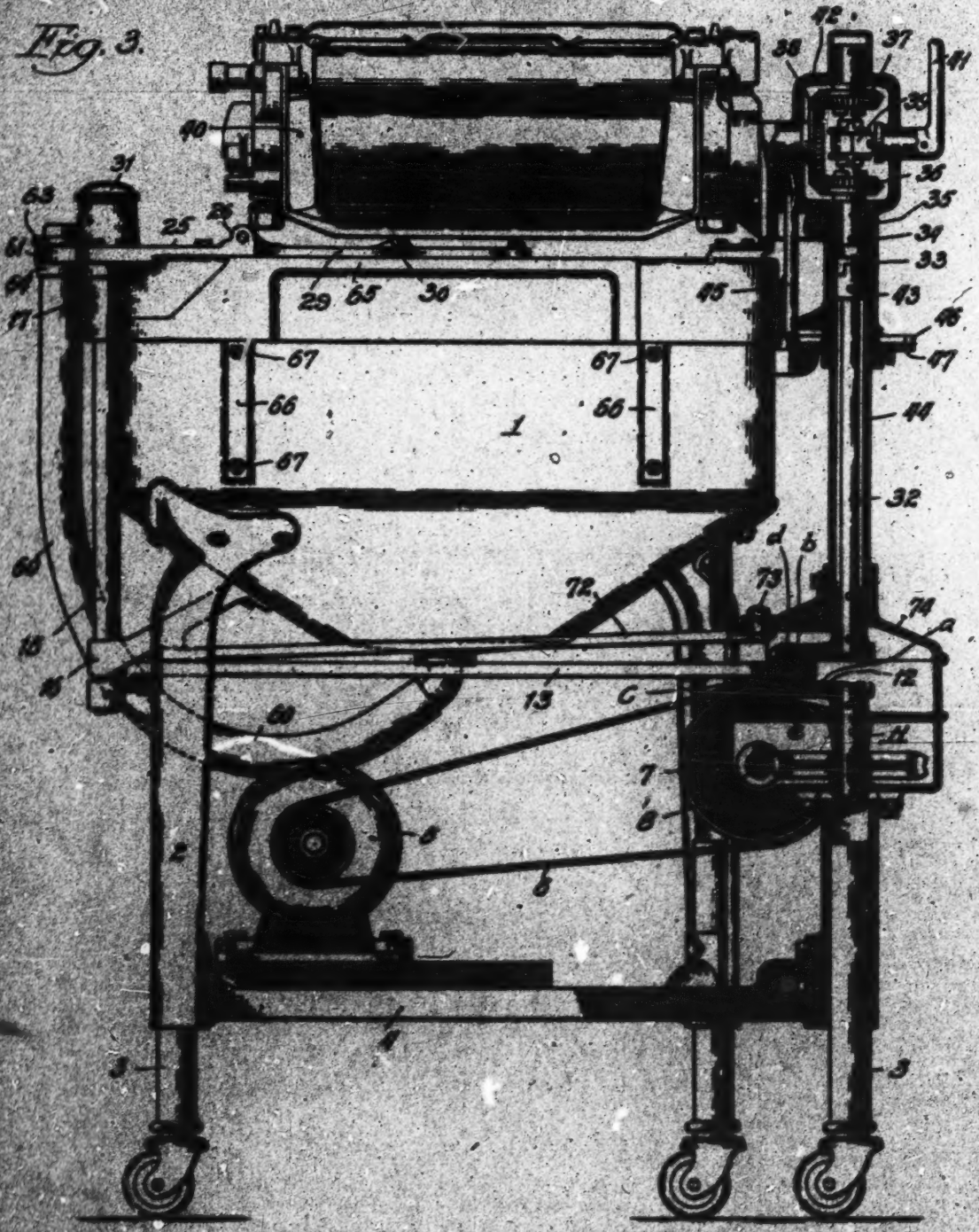
Oct. 11, 1927. 1,644,959

H. F. SNYDER

WASHING MACHINE

Filed June 16, 1921 5 Sheets-Sheet 3

Fig. 3.



Witness:
John Enders

Inventor:
Howard F. Snyder.
By Hudson & Young
Atty.

Oct. 11, 1927. 1,644,959

H. F. SNYDER

WASHING MACHINE

Filed June 16, 1921 5 Sheets-Sheet 4

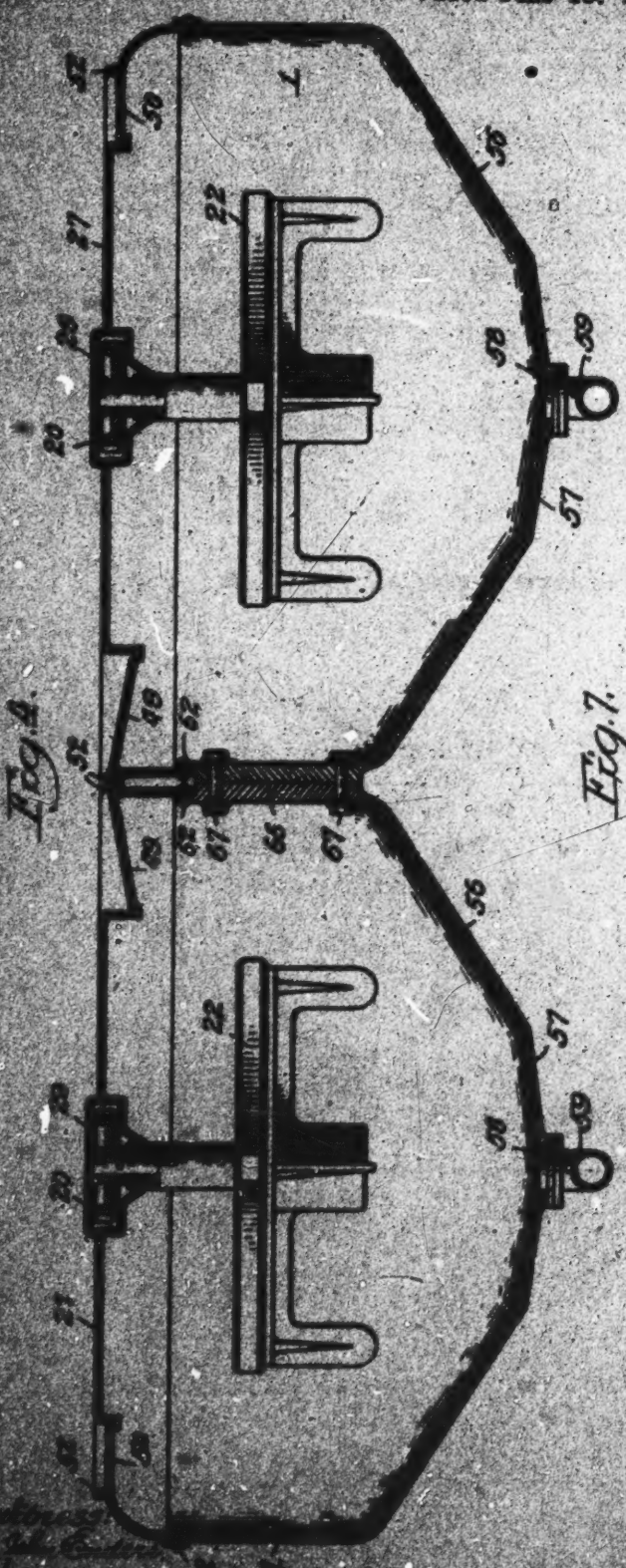


Fig. 4.

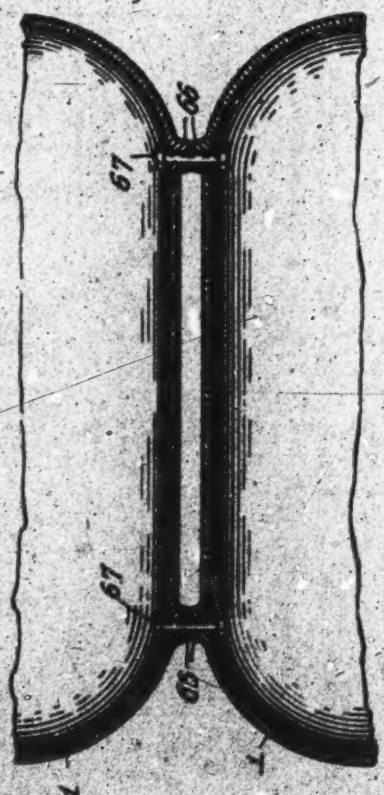


Fig. 7.

Inventor:
Howard F. Snyder.
by Wallace R. Lane.
Atty.

1,844,959

Filed June 10, 1931 6 Sheets-Sheet 6

Fig. 5.

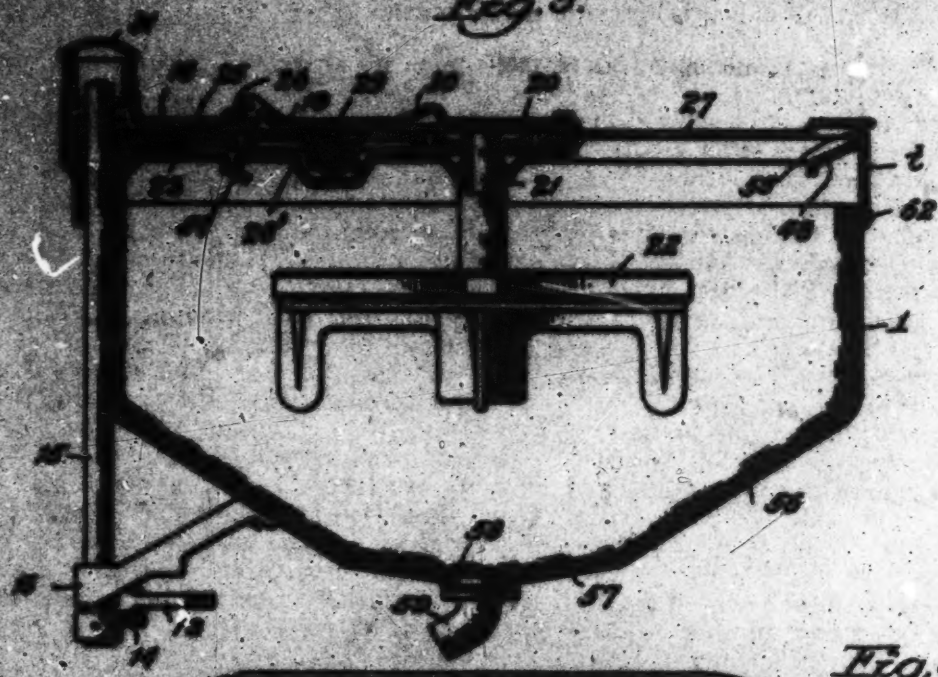
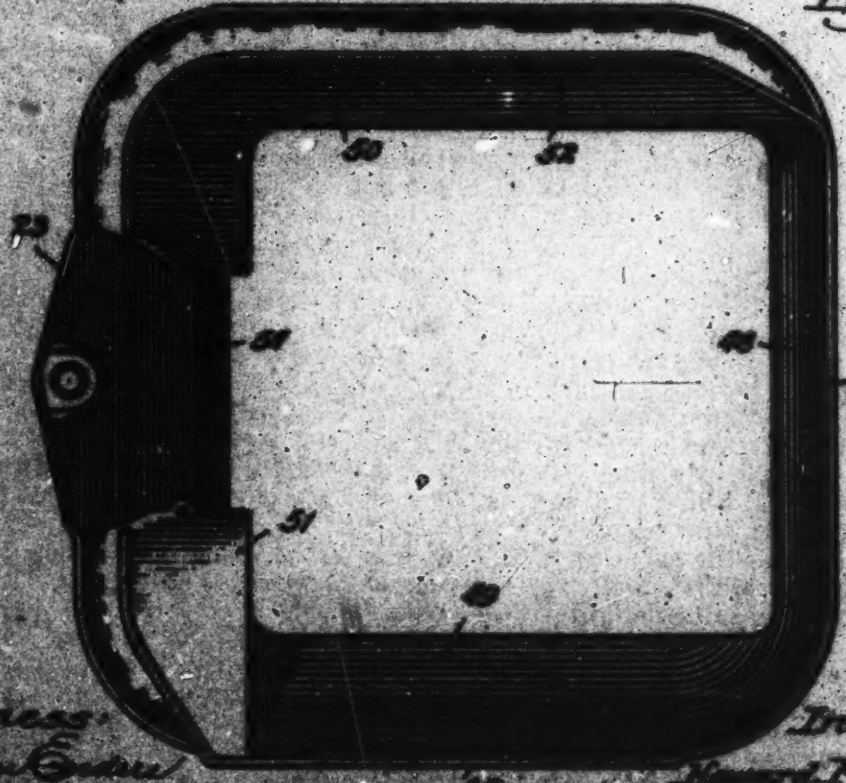


Fig. 6.



Witness:
John Enders

Inventor.
Howard F. Snyder.
by Nathan A. Rice.
Atty.

UNITED STATES PATENT OFFICE.

EDWARD F. MEYER, OF NEWTON, IOWA, ASSIGNOR TO MAYTAG COMPANY, OF NEWTON, IOWA, A CORPORATION OF DELAWARE.

WASHING MACHINE.

Application filed June 14, 1926. Serial No. 677,008.

This invention relates to washing machines, and includes among other improvements such construction that either before or after a period of use a need for increased capacity can be met by merely securing an auxiliary washing machine, substantially similar in construction to the first machine (except to omit the motor and wringer), to be connected to the first machine for operation from the motor thereof, to enable both machines to work together as a unit.

Among the further objects of my invention is to provide for the attachment of an auxiliary washing machine to one already in use, in a quick, simple and efficient manner, such machines to be driven from the motor of the first machine by a simple and quickly effected connection, and both served from a single swinging wringer; further to provide novel means for connecting together such plurality of machines; further to generally improve washing machine construction; further to so construct the top portion of the tub or tubs that spilled water will run back into the tub instead of on the floor; further to form the body portion of the tub of metal, preferably aluminum, and sloped toward the center to permit the easy attachment of a hose, or the like, to effect ready draining of the tub without tilting the same; further to provide washing machine tubs constructed with one or more flat sides at the upper portion; to so arrange the dolly driving mechanism in the top of the tub as to make the top thereof substantially unobstructed and practically flat; further to provide an improved washing machine tub formed of aluminum, which will not become corroded, rust, corrode, dry out, silver or split; further to increase the capacity of clothes washing machines while occupying a small floor space; further to render possible the washing of only a few pieces with little water, and permit removal of the water from the tub without tipping the tub; further to provide improved means for automatically throwing the wringer out of gear when the lid is raised and into gear when the lid is closed; further to provide a washing machine extremely easy to operate and having the minimum number of moving parts and the minimum danger of injury to the operator; further to provide a washing machine constructed substantially entirely of metal, and one that can be easily cleaned, always sanitary, and light in weight; further to so combine a washing machine and swinging wringer that the latter can be removed by merely lifting it from the frame; further to produce a washing machine of maximum simplicity, efficiency and economy; and such further objects, advantages and capabilities as will later more fully appear.

My invention further resides in the combination, construction and arrangement of parts illustrated in the accompanying drawings, and while a preferred embodiment is shown therein, I desire the same to be understood as illustrative only, and not as limiting the scope of my invention.

In the drawings:—

Fig. 1 is a perspective view of a clothes washing apparatus embodying my invention.

Fig. 2 is a plan view of the arrangement shown in Fig. 1, but omitting the gear casing cap from the left hand machine, and with the wringer removed.

Fig. 3 is a sectional view on line 3—3 of Fig. 2, but showing the wringer in position, the main parts of the wringer being shown in elevation.

Fig. 4 is a vertical longitudinal section on a central vertical plane, taken through both tubs of Figs. 1 and 2.

Fig. 5 is a vertical section through one of the tubs on a plane at right angles to that of Fig. 4.

Fig. 6 is a plan view of the top of one of the tubs, with the cover and associated parts removed.

Fig. 7 is a fragmentary sectional detail, showing the manner of connection between the two tubs.

Fig. 8 is a detailed plan view of the operating parts beneath the tub.

Referring to the drawings, Fig. 1 shows the parts of a washing machine embodying

into upon which collar is seated the lower [illegible]. As will be readily noted, this construction is such as to enable the wringer to be readily removed from its support by merely raising the same vertically from column 44, and when desired replaced through reverse operations.

As will be seen in Fig. 5, the two sides 48 and 49 of the top of the tub adjacent which the wringer will be swung in two of its positions are downwardly and inwardly inclined to return any water coming in contact therewith from the wringer into the tub. The greater part of the remaining sides bounding the opening in the tub top are flat, as shown at 50 and 51, and the entire top of the tub is substantially surrounded by an upstanding flange 52, to assist in returning any spilled water back into the tub, and prevent the same from going on to the floor. It is also to be noted that the inner edge of the botttom of depression 23 is downwardly and inwardly inclined, as shown at 54, in Figs. 5 and 6, which construction further assists in returning spilled water into the tub. The under face of the marginal portion of the tub lid 27 is formed with the depending flange 55, which as seen in Fig. 5 fits inside of upstanding rib or flange 52 to effect a substantially water tight joint.

As seen in Fig. 5, the body portion of the tub is sloped inwardly and downwardly as shown at 56 and 57, and is provided at its central and lowermost portion with an opening 58, to which is suitably and in a water tight manner connected the outlet member 59, to which member in turn is secured a drain hose, or the like, 60, which when not in draining position is at its free end placed between the projecting fingers 61 at the top of the tub to be held therein while the tub is in operation, which as will be noted positions the outlet end of the drain hose above the water level, and prevents the passage of any water through the drain hose. This construction, if desired, may take the place of a valve, thus rendering the drain hose always ready for use by simply detaching it from supporting fingers 61, and the end of the hose moved to a sewer, grating, bucket, or the like. As seen in Fig. 5, the top portion 1 of the tub is secured by rivets, bolts, or the like, 62, to the bottom portion of the tub. From Fig. 2, it will be noted that the drain hose supporting fingers 61 are formed as part of cover plate 29, and extend a slight distance beyond the side of the tub. It will be understood that the end of drain hose 60 will be provided with suitable extensions 63 and 64, to insure that the end of this hose will be retained in position in fingers 61, until its removal is desired.

The upper portion of the side of tub 1 is substantially [illegible], and this side, viewed in Fig. 1 is of [illegible] formation to

as to secure contact therewith of an adjacent tub to be secured to the first tub. This is effected by providing this side of the top portion with upstanding and narrower portions 63, and the lower or main portion of the tub body with outstanding ribs 66, whose faces are in the same plane with the faces of portion 65. A similar construction is found in the auxiliary tub or extension to be attached to the first described tub, which connection is effected by the bolts, or the like, 67, extending through ribs 66. By this arrangement the tub of the auxiliary machine may be quickly and securely fastened along side of the first tub, and operated from the motor of the first machine in a manner now to be described. Assuming that the user has operated the tub above first described, and finds a need for greater capacity, he can secure a second machine without the motor or wringer, with the two legs on the side adjacent the first machine omitted (or such two legs may be removed) and quickly secure the second machine to the first machine as described above. To effect operation of the second machine from the motor of the first machine, all that is necessary is to connect the free end 70 of the coupling member connecting rod 13′ of the second machine pivotally at 71, to connecting rod 13 of the first machine, which will result in the movement of connecting rod 13 being transmitted through connecting rod 13′ to crank 14′ of the second machine, and through a vertical shaft 15′ similar to shaft 15 of the first machine, the rotary oscillatory motion of which will be transmitted to the dolly of the second machine, through mechanism similar to that already described above. With this arrangement, only a single motor (that of the first machine) is necessary, and both tubs will be served by the wringer of the first machine. If desired, additional bracing members 70 may be applied to the second machine. If desired, an additional brace member 72 may be secured at one end by a suitable bolt, or the like, 73, to the casing 74 of crank 12, and at its other end by a bolt, or the like, 75, to the bracket 16 of the second tub, thus giving additional stiffening means between the two tubs. It is also to be noted that when two machines are secured to operate together, the center of the inside legs of the first machine may be omitted and the adjustable extension 3 may also either be omitted or adjusted either into or out of contact with the floor, as desired. Adjustment of extension 3 into firm contact with the floor, will furnish additional support for the central portions of the [illegible] machine, if desired. While

crank 12 at the upper end of shaft 11 is of the following composite construction. This crank is formed of two cranks, the one crank arm a of which is fixed to the upper end of shaft 11, while the other crank arm b thereof is fixed to the lower end of shaft 39. Crank arm a carries the upstanding pin c for rotatably receiving the end of connecting rod 13. Pin c is formed at its upper end with a depression d for receiving projection e, depending from crank arm b. These interfitting parts causing these two crank arms to rotate together, and at the same time providing a flexible connection between shafts 11 and 39, which permits ready removal of these parts from casing 74, as well as assembling of the respective parts.

It is also of importance to note (see Figs. 2 and 3) that the crank arms 14 and 14′, from which the respective dollies of the two machines are driven, are so positioned relative to each other, and connecting rod 13′ so arranged that when the dolly driven from the crank arm 14 is passing through its dead center, the dolly driven from crank arm 14′ will be rotating at maximum speed.

Having now described my invention, I claim:—

1. A convertible unit washing apparatus comprising a single unit washing machine, including a tub, supporting means therefor, a prime mover mounted on said supporting means, and an agitator in the tub, an auxiliary unit washing machine, including a tub, supporting means therefor and an agitator in the tub, means for detachably and rigidly connecting said units together to operate as a double machine when connected or to permit the operation of the single unit machine alone when detached, actuating connections from the prime mover of said single unit machine to the agitator thereof, and an inert, actuatable means connected to the agitator of said auxiliary machine, said inert means terminating in a coupling member, and means for permitting the detachable connection of said coupling member to the actuating connection of said single unit machine whereby the agitators of said machines may be actuated simultaneously from said single prime mover when said units are connected or whereby said single unit machine may be operated alone when said machines are disconnected.

2. A [illegible]

[illegible] auxiliary washing machine.

3. In a washing machine, a tub, a lid thereon, a rotary reciprocal dolly carried by said lid, and means for reciprocating said dolly, said lid being depressed for forming recesses for including said means.

4. In a washing machine, a tub having a depression in the top thereof, an oscillatable horizontal gear mounted in said depression, and a cover hingedly mounted on said tub, said cover having a depression therein within which is mounted gear to be driven by said first mentioned gear for oscillating a dolly.

5. In a washing machine, a tub having a depressed portion at one side of its top, a segmental rack oscillatably mounted in said depression, a lid hingedly mounted on said tub and formed with a depression, a dolly shaft operating pinion in said depression, a gear between said rack and said pinion, said rack, gear and pinion being positioned in a horizontal plane, and the pitch line tangent between said rack and said gear being approximately parallel to the hinge line of the lid, whereby elevation of the lid will disengage said rack and said gear, and lowering of the lid will cause inter-meshing of said rack and gear.

6. In a washing machine, a tub having a lid hinged thereon, a depression in said lid, a dolly shaft depending from said lid, gearing in said depression for operating said dolly, and a cover plate over said depression and gearing.

In witness whereof, I hereunto subscribe my name to this specification.

HOWARD F. SNYDER.

1089 (Plaintiff's Exhibit 15, Letters Patent No. 1,714,894 to H. F. Snyder, May 28, 1929.)

9866

690

May 28, 1929. H. F. SNYDER 1,714,894

VACUUM AGITATOR FOR WASHING MACHINES

Original Filed Jan. 14, 1922

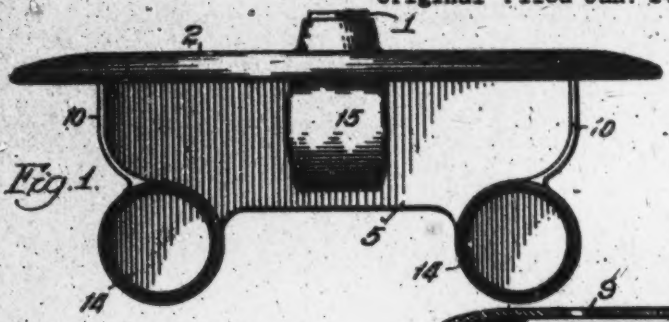


Fig. 1.

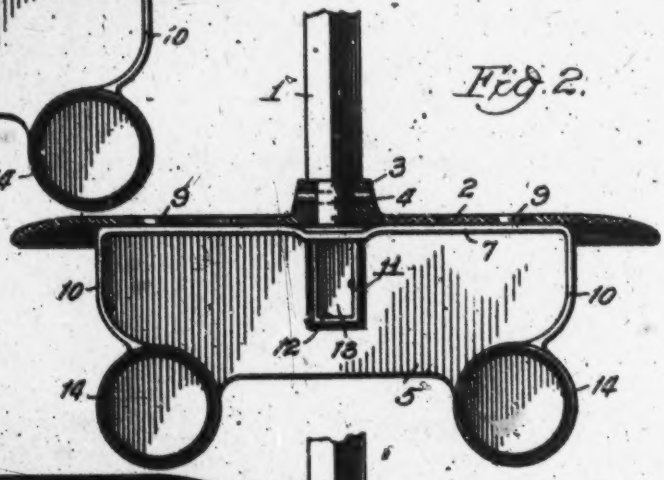


Fig. 2.

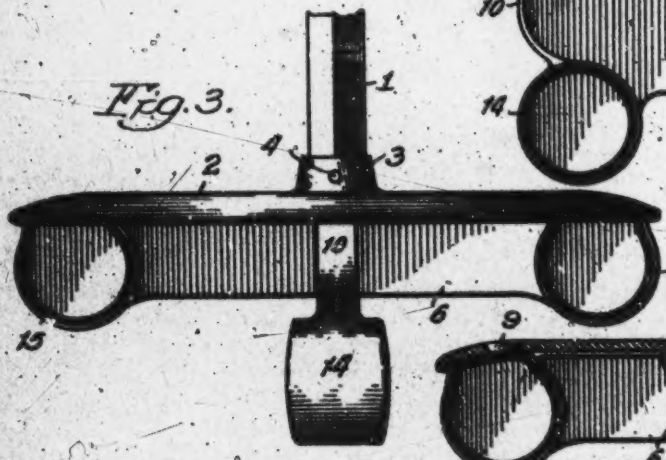


Fig. 3.

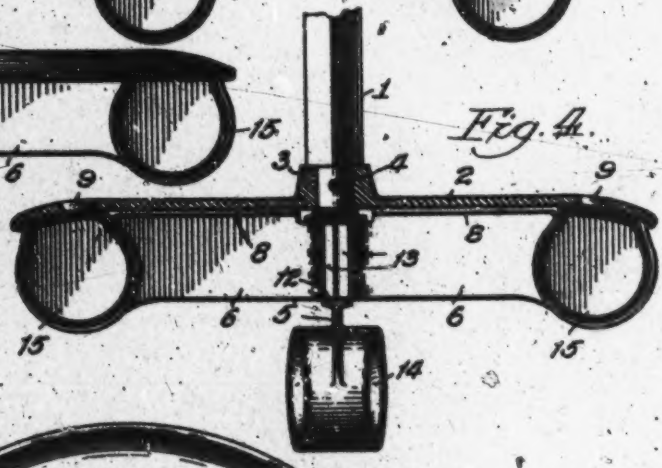


Fig. 4.

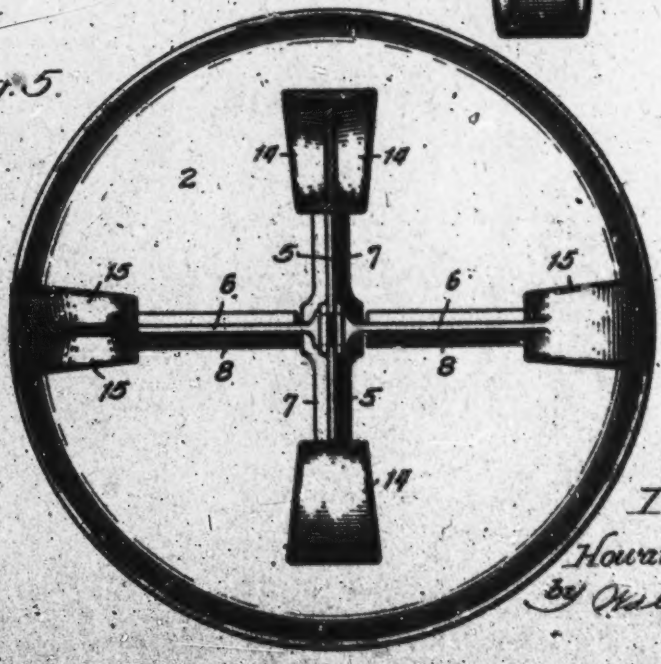


Fig. 5.

Inventor:
Howard F. Snyder;
By Wallace P. Lane
Atty.

096

Patented May 25, 1929.

UNITED STATES PATENT OFFICE. 691

HOWARD F. SNYDER, OF NEWTON, IOWA, ASSIGNOR, BY MESNE ASSIGNMENTS, TO THE MAYTAG COMPANY, OF NEWTON, IOWA, A CORPORATION OF DELAWARE.

VACUUM AGITATOR FOR WASHING MACHINES.

Application filed January 14, 1928, Serial No. 528,131. Renewed March 14, 1927.

My invention relates primarily to an agitator or dolly for use in a machine of the oscillating dolly type and among the objects thereof are to provide an improved washing machine agitator; to provide a structure of the character described having suction cups adapted to act on articles being washed in a manner somewhat similar to that of a reciprocating suction cup device; to provide an oscillating dolly with suction cups to assist in forcing water through the clothing being washed; and such further objects, advantages and capabilities as will later more fully appear.

My invention further resides in the combination, construction and arrangement of parts illustrated in the accompanying drawing, and while I have shown therein a preferred embodiment I desire the same to be understood as illustrative only and not as limiting my invention.

In the accompanying drawing:

Fig. 1 is an elevation showing my improved agitator.

Fig. 2 is a vertical section taken substantially centrally of the device as shown in Fig. 1.

Fig. 3 is an elevation similar to Fig. 1 but taken in a direction at right angles thereto.

Fig. 4 is a section similar to Fig. 2 but taken in a direction at right angles thereto.

Fig. 5 is a view from the under side of Fig. 1, but showing parts of the structure in section.

Referring more in detail to the annexed drawing, numeral 1 designates the usual power driven agitator shaft, which may be circular or angular in cross section, depending upon the construction of the machine with which this device is to be used. Numeral 2 designates the body plate of the agitator having substantially centrally thereof a boss 3 through which passes a securing means 4 to secure the shaft 1 to the plate 2. Webs 5 and 6 are provided with flanges 7 and 8 to assist in preventing them from rocking when secured to the plate 2 by means of projections 9. The web 5 has its flange 7 continued around the ends as shown at 10 to serve as reinforcing means for the strengthening of the web. Web 5 has an aperture 11 therethrough which is bordered by a flange 12 on each side of the web and webs 6 have each one end such as 13 shaped to fit into the perforation 11, as shown in Figs. 4 and 5.

These ends 13 are preferably considerably heavier than the webs and therefore assist in furnishing a secure bearing to prevent distortion and breaking of the parts in use. On each side of each free end, the webs are provided with flanges which form cups 14 and 15, the former being substantially circular and the latter being somewhat flattened on one side to fit closely against the under face of the plate 2, as shown most clearly in Fig. 4.

It will be obvious from the foregoing description that, as the agitator shaft 1 is oscillated, first one set of cups 14, 15 will act upon the clothing in the machine, and then the other set will act thereon as the agitator is oscillated in the opposite direction. It will therefore be clear that these cups 14 and 15 will force water through the clothing, besides performing the ordinary function of oscillating the clothing in the machine in the manner of dollies provided with pegs.

It is of course understood that the specific description of structure set forth above may be departed from without departing from the spirit of my invention.

Having now described my invention, I claim :—

1. In a dolly, a substantially imperforate member adapted to be oscillated about an axis, said member having a blade extending therefrom, said blade having a suction cup thereon disposed transversely to the plane of said member.

2. A dolly comprising an oscillatory plate having downwardly extending projections, and laterally directed suction cups on said projections.

3. A washing machine agitator comprising an agitator shaft, a plate secured thereto, and agitator members extending transversely of one face of the plate and having cups thereon facing laterally.

4. A washing machine agitator comprising an agitator shaft, a plate secured thereto, and agitator members having suction cups on opposite faces thereof extending substantially perpendicularly to the body of the plate.

5. A washing machine agitator comprising an agitator shaft, a plate secured thereto, and agitator members having suction cups on opposite faces thereof extending substantially perpendicularly to the body of the plate, one of said members comprising a web-member having an aperture therethrough

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and the other agitator members comprising web-members each provided at one end with a portion adapted to fit into the aperture in the first named web-member.

6. In a dolly, an oscillatory support having projections rigid therewith, and suction cups being formed in said projections remotely of the axis of oscillation of said support.

7. An agitator for effecting washing operations, comprising a substantially imperforate disk oscillatable about an axis and formed with a relatively deep member projecting from said disk, said disk having a cup-shaped portion thereon operative to press upon the material to be washed when moved in one direction and to create a suction when moved in the opposite direction.

8. An agitator for effecting washing operations, comprising a substantially imperforate disk oscillatable about an axis and cup-shaped members rigid with said disk for movement therewith during the alternately rotary movements thereof, said cup-shaped portions operative to press upon the material to be washed when moving in one direction and to create a suction when moving in the opposite direction.

9. A dolly comprising an oscillatory plate formed with transversely arranged suction cups at the border of said plate remote from the axis of oscillation of said plate.

10. A dolly comprising a vertical shaft, a disc fixed to said shaft, and suction cups fast with said disc, near the periphery of said disc.

11. A dolly comprising a shaft, a plate fixed to the shaft, and suction cups depending from the edge portions of the plate.

12. A dolly comprising an oscillatory disk having transversely disposed suction elements thereon and arranged at variant distances from the axis of oscillation of said disk.

13. A dolly comprising an oscillatory disk having suction elements thereon arranged at variant distances from one surface of said disk and also arranged at different distances also laterally of the disk.

14. A dolly comprising an oscillatory disk having transversely disposed suction elements thereon arranged to travel in different horizontal planes during the oscillation of the disk.

15. A dolly having suction cups connected therewith, said cups being positioned in different horizontal planes so as to travel in different horizontally disposed paths in the liquid.

16. A dolly comprising a vertical oscillatable shaft and carrying a plurality of suction cups having their open mouths disposed substantially transversely to the axis of the shaft and arranged in different horizontal planes.

17. A dolly comprising a vertical oscillatable power driven shaft having substantially flat webs extending horizontally therefrom and at right angles to each other, each of said webs carrying a plurality of suction cups arranged so that their open mouths oscillate in horizontal paths.

18. A dolly comprising a vertical oscillatable power driven shaft having substantially flat webs extending horizontally therefrom, said webs being of different widths, and said webs carrying suction cups adapted to oscillate in horizontal planes.

19. A dolly comprising a vertical oscillatable power driven shaft having substantially flat webs extending horizontally therefrom, said webs being of different widths, and carrying suction cups disposed in different horizontal planes.

20. A dolly comprising a plate oscillatable in a horizontal plane and suction cups having their open mouths disposed at an angle to the plane of the plate and oscillatable therewith.

21. A dolly comprising an oscillatory plate, vertically disposed webs carried by the plate and suction cups carried by the webs.

22. A power driven oscillatable shaft, vertically disposed webs extending from the shaft to oscillate in a horizontal plane and suction cups carried by the webs.

23. A power driven oscillatable shaft, four webs radially carried by the shaft, each of said webs carrying suction cups having their open mouths facing at an angle to the axis of oscillation of the shaft.

24. A dolly comprising an oscillatory disc provided with suction elements having their axes transversely disposed.

25. A dolly comprising a shaft and an oscillatory disc provided with suction elements having their axes transversely disposed with reference to said shaft.

In witness whereof, I hereunto subscribe my name to this specification.

HOWARD F. SNYDER.

DEFENDANTS EXHIBIT
IN EQUITY 2862
GENERAL ELECTRIC SUPPLY CORPORATION
THE MAYTAG COMPANY

It's miracles like these NEW washers that have made General Electric famous!

New *You have to listen twice to hear it!* Never before has a washer been so quiet! Actually, the New G-E, running at full speed, is as quiet as a kitten's purr. It doesn't sound like a powerful machine doing a tubful of dirty clothes. But lift the lid—and you'll see that there's plenty doing inside!

New *You don't have to guess at the temperature of your suds!* The New G-E model pictured has a Temperature Indicator right on the cabinet. Tells you when the water is just right for (1) sunfast colors, (2) silks and woolens, (3) cottons and linens, (4) wash and rinse. Think what this saves you in the life of precious fabrics.

New *It leaves buttons on!—No more scenes like this!* The New G-E Washer is most remarkable of all because of the way it washes clothes. In a few minutes, it can prove to you that the rubbing and pummeling methods of 3,000 years have been wrong! Clothes DON'T have to be worn out before their time. See the almost miraculous way the exclusive G-E Activator forces suds through fabric, makes suds and water currents do all the work.

New *It's easily the smartest looking washer ever made!* Designed like a fine piece of modern furniture—marks a new day in the appearance of washing machines. All moving parts completely covered. Makes a handsome and useful table. Easily cleaned. Costs no more than ordinary washers . . . . Only **$49.50** AND UP

YOUR General Electric dealer will show you the NEW LINE of G-E Washers with more than the usual "sales talk"—with real pride in his voice.

For General Electric engineers have made these washers more than "new models" or "improved editions."

They've gone to the very roots of washing clothes. They've asked, "Do dirty clothes actually have to be rubbed, or pounded, to get them clean? Isn't there some gentler way?"

They've watched hand washing . . . how sudsy water is forced through fabric, and designed a washer that copies this gentler hand method—on a high-speed scale.

The G-E Activator, specially designed, washes even heaviest pieces as you wash dainty lingerie—by gently forcing suds through the fabric, many times a minute.

See this NEW kind of washing machine. You'll delight in the double-quick time it turns out the snowiest wash. And look! *No oiling ever required!*

You'll like the G-E "one control" Wringer, too—only 1 control instead of 4. And the price? As low as $49.50.

For full details, write Mr. J. M. Wicht, manager, Home Laundry Equipment Sales, General Electric Co., Dept. H-5910, Bridgeport, Conn.

New *This washer is managed by foot control alone!* No stooping to start the Activator or stop it. Or to pump out the dirty water. It's all managed by a touch of your foot on the pedals. General Electric is the first to offer you this complete foot-control.

Prices Slightly Higher in the West, Far South and South.

GENERAL ELECTRIC

HOME LAUNDRY EQUIPMENT

RAB

PLAINTIFF'S EXHIBIT 16. 693

Nursery schools are built upon the idea that the most important years for learning habits and attitudes are from 2 to 6 years

Shall I Send My Child to

Nursery School?

By Gladys Denny Shultz
Better Homes & Gardens' Child Care and Training Director

IT IS housecleaning time. In addition to the usual upset attendant upon this operation, cupboards are being painted and all those seldom-used objects which generally repose upon high shelves lie exposed and defenceless upon chairs and tables.

The situation has provided marvelous mental stimulation for a certain 4-year-old boy whom it is my responsibility and desire to keep intact as far as possible. The high ladder for the first time affords ready access to the roof. The big wrench has been used to turn the screw cap on the gas tank of the car, a perfume atomizer has sprayed the wall of the garage with a fragrant shower. As for the cans of paint, they have furnished just one inspiration after another.

It is therefore with a certain keen personal feeling that I address myself to the subject, "Shall I send my child to nursery school?" Is it cowardice for a mother—say, at housecleaning time—to dream of some haven where runabouts may get superlative care and training without annoyance to her? Is it a neglect of duty to delegate to others the tasks that heretofore have belonged to the mother, or at any rate have been carried on in the home?

Until recently most parents have not been much concerned because the number of nursery schools has been relatively small. The Educational Emergency Relief program, however, gave the movement great impetus by conducting temporary nursery schools last spring in thousands of communities which had not had a kindergarten or nursery school. The next step will come as soon as economic conditions permit. Educators feel that the nursery school has proved its worth and should be incorporated in the public-school system whenever funds can be made available for this purpose. To us as parents and voters both, therefore, the question may before long become a real one. How shall we answer?

First, let us understand fully what a nursery school is and what it does for children. As the name indicates, it is for youngsters of the pre-school age. Some take tiny folks of 18 or even 14 months, but the usual ages are from 2 to 4 years. The theory upon which the movement is founded is that these are the most important years in life from the point of view of building habits [*Continued on page 77*

Children are allowed to play freely, are not interfered with unless necessary, but they are taught essential disciplines

PLAINTIFF'S EXHIBIT 16.
695

U.S.D.C. W.D.Mo.W.
In Equity 2892
Pltf's Cross Ex. 6

PLAINTIFF'S
Exhibit No. 16a
AMF

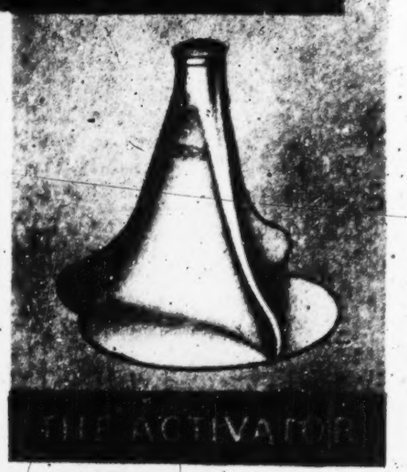
The New G-E Double-Tub Washer

NO more frayed cuffs or collars—no more torn sheets—no more fears for silken lingerie—for in this washer your clothing gets a thorough scrubbing on a "washboard of clean soap suds."

Here, at last, is a washer that does *all* the work. Washing, rinsing, wringing—and so easily and quickly that you can well imagine you have a complete laundry at your command. At a touch of the switch the famous G-E ACTIVATOR starts a steady *swish-swish* of the clothes guiding them up and down, through all the washing zones, forcing water quickly and surely through each individual piece, always gently—never harshly. How effortless it is to transfer the clean clothes from one tub to the other—just lifting them over a slight partition for the damp drying at the touch of another conveniently located control. No need to worry about getting rid of the dirty water—a handy pump transfers water into the sink or drain. And too, there's a filler hose to help fill the washer with water.

Here's Why You Need the Double-Tub

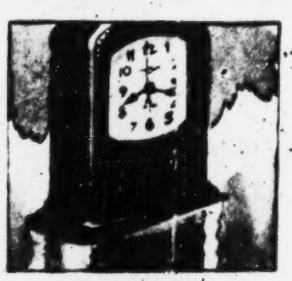
Just as the G-E FLATPLATE is a great advance over hand ironing so the G-E Double-Tub is the last word in washing machines. This washer enables you to dispense with laundry tubs. The two tubs take care of all demands. Whether it be lacy lingerie, woolen blankets, greasy overalls, fluffy pillows, the G-E Double-Tub washes and damp-dries quickly, easily and thoroughly. Have this G-E Double-Tub demonstrated in your home and learn how it can start to save for you the moment it starts in to work.



With the Exclusive ACTIVATOR [illegible]

The ACTIVATOR [illegible] Different from [illegible] by *water action alone*—with no harsh scrubbing. That is why it is safe to wash even your daintiest pieces. Because of its unique design the currents set up by the ACTIVATOR'S motion cause the clothes to be flexed, and hot sudsy water to be forced through the mesh of the fabrics, thus assuring a perfectly and thoroughly done washing. The ACTIVATOR eliminates tangling and braiding—the common occurrence that causes clothes to wrap tightly around the ordinary agitator post and cause tearing and straining. Make the Towel Tug Test and see how the ACTIVATOR works.

G-E Double-Tub Washer Saves Your Hands
The ACTIVATOR and Spin-Basket do all the work—not you. You simply superintend and control.



G-E Double-Tub Saves Ironing Time
No deep set creases to iron out when clothes come out of the General Electric Super Spin-Basket.

G-E Double-Tub Washer Washes Silks and Lingerie Safely
No need to worry about dainty pieces. The ACTIVATOR and Super Spin-Basket can't harm anything.

G-E Double-Tub Washer Does Heavy Blankets and Pillows
Your best woolens come out soft, dry and fluffy from the Super Spin-Basket . . . and it's so easy to do.

G-E Double-Tub Washer Saves Money
No more laundering bills or laundress' wages. A few cents is all it costs to do your family's laundry.

A Modern Washer for Modern Homes—General Electric Double-Tub

GENERAL ELECTRIC WASHER

PLAINTIFF'S EXHIBIT 16 A. 697

PLAINTIFF'S EXHIBIT 16 A. 699

GENERAL ELECTRIC WASHER

Here's GENERAL ELECTRIC'S latest Helper for you

The most appealing washer ever built. Designed, inside and out, to make washing a simple, tireless and effortless procedure. This advanced, Double-Tub washer does all the work . . . washing, rinsing and drying with but little attention. The marvelous ACTIVATOR and the Super Spin-Basket, both exclusive G-E features, assure safe thorough washing and quick drying. A quick action, automobile type pump empties the tub in about two minutes . . . no lifting of water necessary.

Note the attractive, mottled blue finish on the porcelain tubs. The base and the skirt are finished in china blue to harmonize with the tubs. Highly polished aluminum splash rim and covers help to make this washer unsurpassed in its appeal. All controls are on a panel where they are easy to reach . . . no stooping required. A genuine G-E ¼ horsepower motor assures trouble-free service—year in and year out.

Simple . . . Economical . . . Thorough.

Does All the Washing for you . . . The New GENERAL ELECTRIC DOUBLE TUB WASHER

SAVE IN SIX WAYS

. . . through this new Double-Tub Washer with the exclusive ACTIVATION principle.

Here's how the Double-Tub saves in six ways.

1. Saves space—by the square design, the washer fits conveniently into any corner.
2. Saves time—by washing faster and damp-drying more quickly.
3. Saves effort—by eliminating heavy lifting of soaked clothes and buckets of water.
4. Saves rubbing—by flushing out all of the loosened dirt.
5. Saves mending—by the ACTIVATOR principle, the clothes are washed gently but positively, preventing wear, tear and strain.
6. Saves money—by doing more in less time, saving laundress wages and reducing wear and tear on clothes.

More Time for Recreation—thanks to the efficient Super Spin-Basket

Minutes count these days. That's why the Super Spin-Basket was built for this washer. It not only saves time, but effort—worry. And best of all is due to perfectly. It's faster because of its efficient design and high speed. It's safe because it has no rough edges or sharp points to cause damage to your most delicate laces or lingerie. It's economical because you can be washing one lot of clothes while you're damp-drying another.

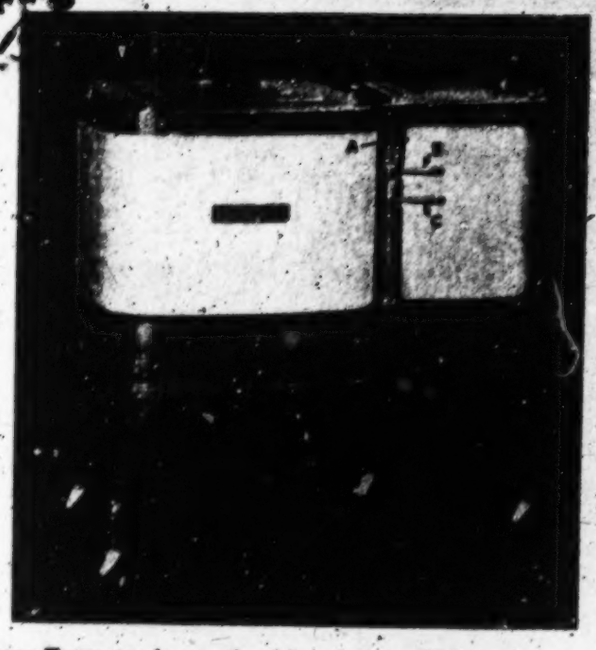
No more squeezing or twisting, no more tedious piece-at-a-time feeding. Just pleasant unconcerning from one tub to the next, a touch of a switch—and in a few minutes clothes so perfectly damp-dried that, in an emergency they might even be ironed.

Pillows, overalls, blankets, turkish towels, lacy lingerie—they're all dried quickly in the Super Spin-Basket.

WE SUGGEST THAT YOU KEEP THIS CARD IN SOME CONSPICUOUS PLACE

DIRECTIONS
For Using Your
GENERAL ELECTRIC
Washer
MODEL "2G"—EXTRACTOR TYPE

PLAINTIFF'S Exhibit No. 16 AMF



YOU have chosen wisely in selecting a General Electric Washer—you will find it remarkably efficient and easy to operate. Many years of washing enjoyment will be yours if these brief instructions are carefully followed.

Sorting and Preparing Wash

Material to be washed should be carefully sorted; the following grouping is suggested.

1. White clothes, (table linen, bed linen, men's shirts. etc.)
2. Silks, chiffons, etc.
3. Flannels and woolens.
4. Colored articles, ginghams, etc.
5. Dark articles, socks.
6. Overalls, etc.

Note: It is not necessary to change the washing water after each lot. The frequency with which the water should be changed depends upon the soil of the clothes.

It is not necessary to boil wash. The vigorous, yet gentle, action of the ACTIVATOR loosens and removes the dirt without boiling. In addition, fatty body oils (which cause the soil in wrist-bands, collars, etc.) are likely to be cooked into the fabric by boiling rather than loosened and washed out.

BOILING THE SOAP IS UNNECESSARY

Keep up suds by adding soap to each new lot of clothes.

Borax is a good water softener and bleaching agent and is not injurious to fabric. A tablespoon to a tub of water is sufficient. Soaking the wash in lukewarm water for a short period of time is advisable, as fabrics are expanded, thereby permitting a free action of the water in removing dirt.

Never soak clothes in hot water, as many stains are thereby set.

Washing Instructions

Be sure that drain valve "D" at the bottom of tub is closed. For capacity load fill the tub with hot water to line marked on Activator. For smaller loads reduce water level slightly to hasten washing. Water level, however, should never be less than 3 inches.

If the clothes have been soaked prior to washing, place them in the Extractor to remove this water before washing. This procedure will provide a means of determining the proper amount of clothes to wash at one time, as a full Extractor load is also a full load for the washer.

To start motor, shift Extractor "C" and Activator "B" control levers to "off" position, which is to the left; connect extension-cord plug to convenience outlet, and throw tumbler switch "A" to "on" position.

To start Activator, throw lever "B" all the way right until it locks. To stop, throw lever to left.

Add sufficient powder, chips or soap to give good washing results, but not enough to generate excessive suds in extractor tub when drying clothes. Add water softener if necessary.

Place washing in the tub while the Activator IS IN MOTION. Distribute uniformly. Better results are obtained by washing smaller quantities of clothes for shorter periods of time than by crowding the machine with large loads. The former method will produce the same results in much less time.

The washing time required depends entirely upon the condition of the clothes. For proper washing action the clothes should be turning over freely in the water.

Drying

When the washing of the first lot has been completed, stop the Activator.

Transfer the wash from the tub to the Extractor. Distribute clothes uniformly to secure even running of the Extractor. Pack clothes down tight. Close cover over Extractor and start Extractor by throwing lever "C" all the way to the right. Allow Extractor to operate for three or four minutes (the longer Extractor is run the drier clothes will be).

To stop Extractor throw lever "C" to left until it locks. The clothes are now damp-dry and ready for rinsing and bluing.

A second lot of clothes may be washed while the first lot is being dried in the Extractor. Damp-drying is usually completed in about one-half washing time, enabling the machine to spin-dry two loads to each washing load, if found desirable.

Pump

The drain is closed when lever "D" is to the right and open when to the left. In the closed position, water extracted from clothes will be removed from the Extractor tub and returned to the washer tub or into a set tub. The drain lever should remain in this position during washing and should be opened only when the washer tub is to be emptied.

After Washing

Shift control levers to "off" position.

Place the nozzle of the drain hose over the inverted tub-lid or some other receptacle, about a cupful of water will drain from the hose.

The porcelain tub is extremely easy to clean. Simply wipe the tubs with a dry cloth after each washing. Lift the Activator and wipe inside and outside.

Do not cover the machine while any moisture is present. Lift out the extractor basket and wipe it dry as well as the tub.

Lubrication

The motor will need no oiling for two years in usual home use.

If the machine is used several hours each day, it should be oiled every three to six months.

The mechanism has been filled with lubricant at the factory and requires no further oiling.

Each week after the washing is finished and while you have the Extractor basket out to wipe the tub, place a few drops of oil in the hole in the top of the Extractor drive shaft.

Guarantee

This machine is guaranteed by the General Electric Company under terms of the guarantee certificate enclosed in the envelope attached to the washer.

We are happy to welcome you into the large and ever-growing family of General Electric Washer owners. We are sure that years of valuable service will result from such ownership. Please feel free to write to us at any time about your Home Laundry problems.

Home Laundry Equipment Section—
Merchandise Department

GENERAL ELECTRIC COMPANY
Bridgeport, Conn.

P. 1097

PLAINTIFF'S EXHIBIT 16 B. 702

FEBRUARY 1935

PLAINTIFF'S
Exhibit No. 16C

The General Electric and Hotpoint Lines of Home Laundry Equipment Will Be

DESIGNED - STYLED - ENGINEERED

MANUFACTURED

AND

SERVICED

at the Bridgeport, Connecticut Works of the General Electric Company

This sensational new line of General Electric and Hotpoint Washers, introduced to the trade last August, has received excellent acceptance from the public. In fact, so great has been the demand for this new equipment that overtime factory production has only now caught up with the tremendous avalanche of dealer orders.

The new 1935 line of Home Laundry Equipment was styled, engineered and designed by the General Electric Company at its Bridgeport Works. Starting February 1st, the General Electric Bridgeport Works will also manufacture and service General Electric and Hotpoint Home Laundry Equipment.

Dealers will welcome this new centralized operation — the complete coördination of engineering, styling, manufacturing, sales promotion and service — all concentrated within a single unit. This impressive program will stimulate and increase volume sales of what are probably the fastest-growing lines of Home Laundry Equipment in America. It will also guarantee the traditional QUALITY so long associated with General Electric and Hotpoint products.

Progressive and wide-a-wake dealers, who join the parade of other successful General Electric and Hotpoint dealers, will cash in on this "Once-in-a-life-time" opportunity to secure increased volume together with steadily growing profits.

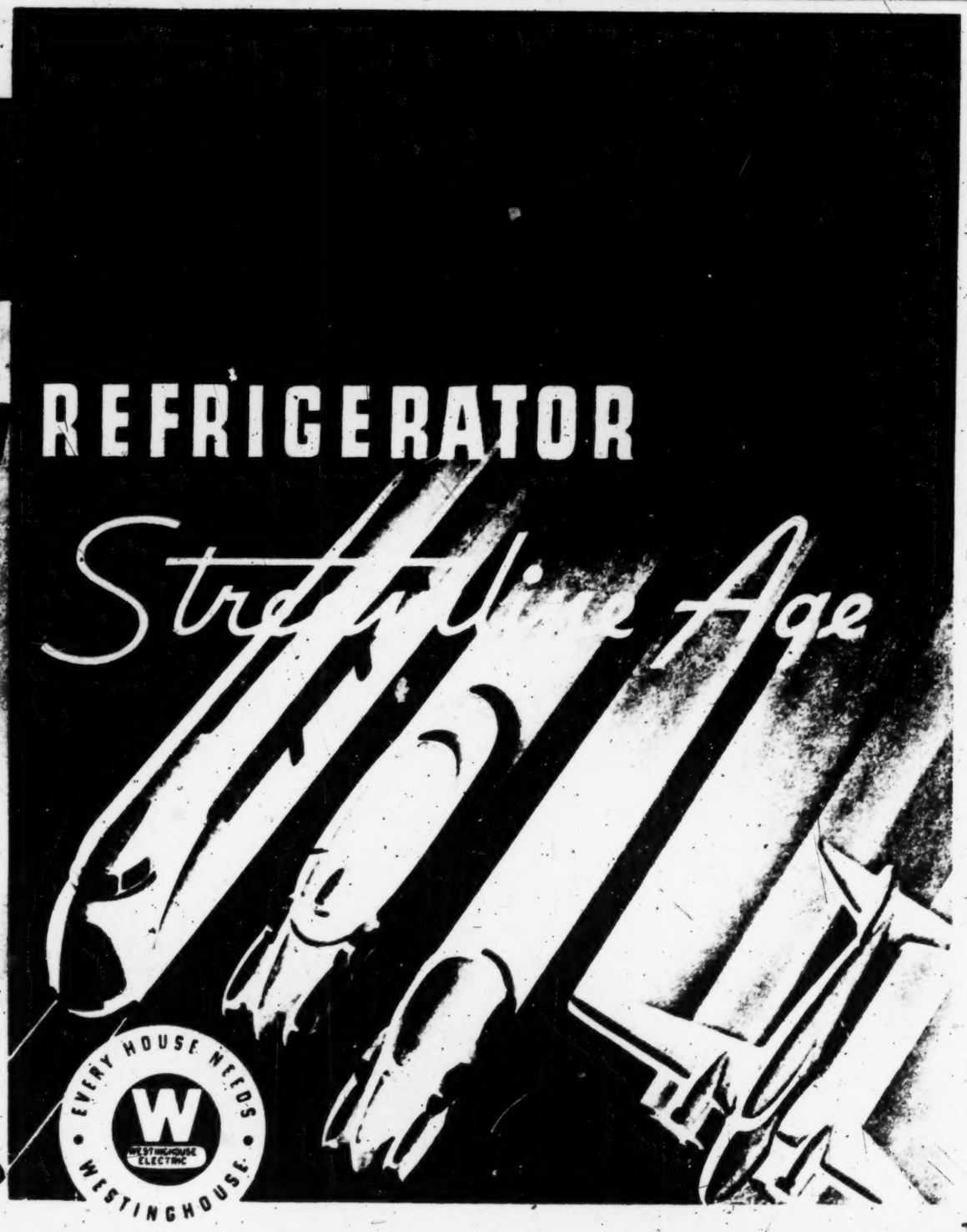
PLAINTIFF'S EXHIBIT 16C.

GENERAL ELECTRIC

CO

THE NEW REFRIGERATOR

Streamline Age



All Eyes on Westinghouse. Watch for Announcement • • Most Spectacular development in refrigeration history!

Westinghouse

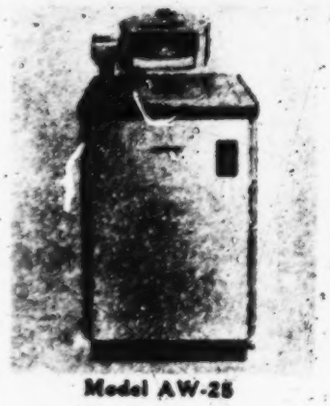
Streamline REFRIGERATORS

PLAINTIFF'S EXHIBIT 16C.

705

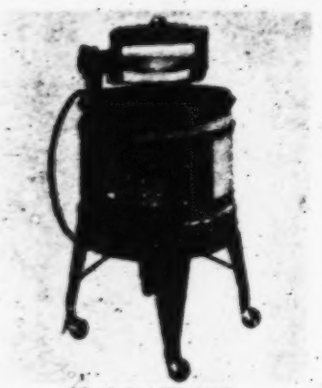
PLAINTIFF'S EXHIBIT 16

. . . BEGINNING

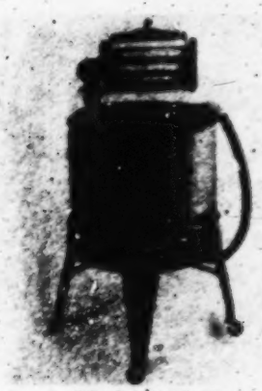


Model AW-25

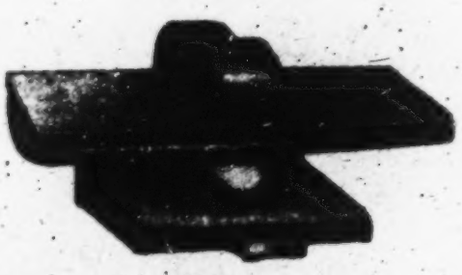
Model AW-24



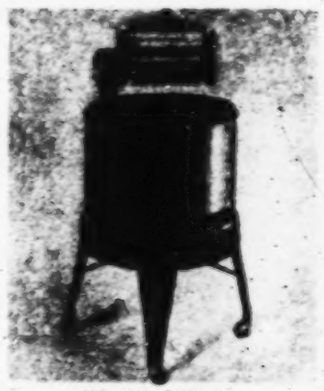
Model AW-23P



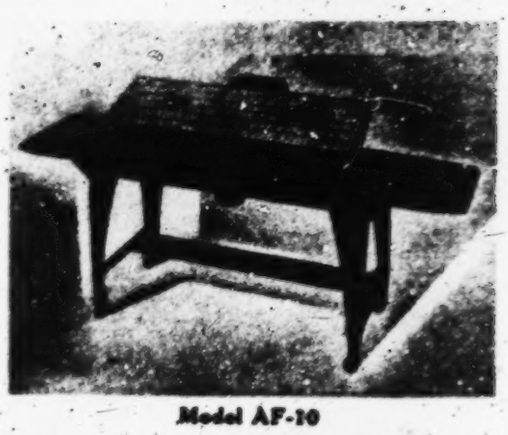
Model AW-22



Model AF-5

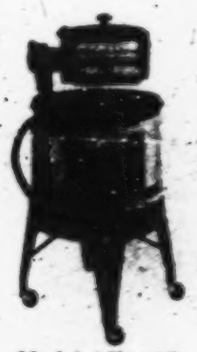


Model AW-21



Model AF-10

Model AW-44

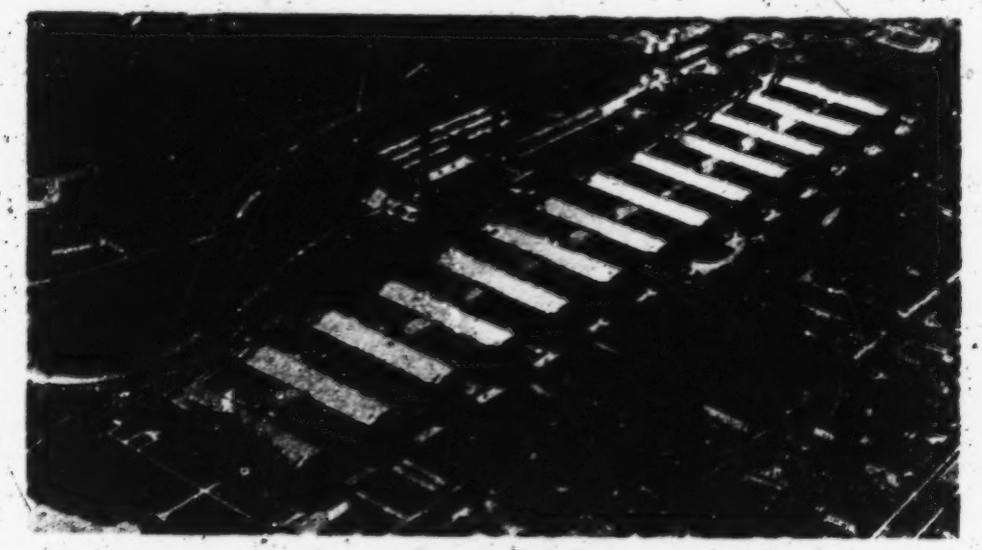


Model AW-43P

Model AW-42

Model AW-41

The complete line also includes Double-tub Washer Models, Electric Dryers and Rotary Ironers.



General Electric Company, Merchandise Department, Bridgeport, Conn.

GENERAL ELECTRIC

PLAINTIFF'S EXHIBIT 16 D. 707

IMPACT!—

. . . on the consumer creates PROFIT for F-M Dealers

● **Impact! That something in a product which, on first sight, appeals so powerfully to the prospective customer that all preconceived ideas are swept away in a quick rush of acceptance and preference. Seldom is a product placed in a dealer's hands which truly has . . . *impact*.**

But you can have it in your electric refrigerator line this year if you act *now!*

Your prospect expects differences in the various refrigerators he inspects before purchasing—and he finds *small* differences. Variation in appearance, shelf arrangement or hardware. Not until he comes to the Fairbanks-Morse Refrigerator does he find a *big* difference. And there he finds the CONSERVADOR! The sheer unexpectedness of it carries impact. And as you explain what the Conservador accomplishes in *economy*, convenience, space utility . . . how *logical* it all seems! No delicate weighing of slight features in the prospect's mind—but one *big*, *exclusive* feature that brings quick acceptance—and profits to the dealer.

The F-M franchise is the most valuable dealer arrangement to be offered for the 1935 season. Write, phone or wire for complete information and name of nearest distributor. Fairbanks-Morse Home Appliances, Inc., 430 S. Green St., Chicago.

Cable Address: FAIRMORSE, CHICAGO

PLAINTIFF'S EXHIBIT 16 D.

FAIRBANKS-MORSE *Home Appliances*, INC.

104 Years of Quality Products

709

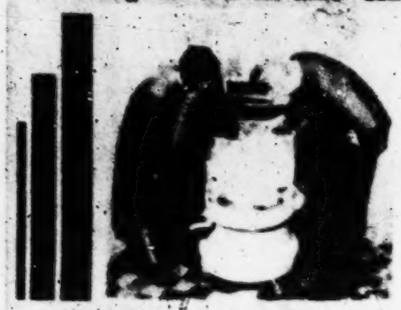
REFRIGERATORS • RADIOS • WASHING MACHINES • IRONERS

PLAINTIFF'S EXHIBIT 16E.

The Balloon Bubble Test

Here is another unique and positive demonstration that shows the ACTIVATOR'S washing action . . . . and helps to clinch the sale.

Place a sheet in the tub along with some other articles—making sure that the sheet "balloons" and stays fluffed up with a large air bubble between the sheet and the water surface—then start the washer. Notice how the sheet is drawn down through the different zones into the Full Power Washing Zone. Gradually but surely the air is forced out of the bubble as the sheet is drawn down.



The ACTIVATOR'S action tugs and pulls every article gently but surely into the Full Power Washing Zone. No article will float idly or remain long on the surface of the water once the ACTIVATOR starts. There are no dead areas in a G-E Washer equipped with the ACTIVATOR.

AND HERE ARE IRONER DEMONSTRATIONS, TOO

G-E has originated these two forceful demonstrations in order to increase your Ironer sales. They are simple, easily explained and practical to use on every ironer prospect. Take advantage of them.

The Soaked Sponge Test

1. Release the shoe of the ironer so that it can be tilted backward. Place a wet sponge in the "hollow" of a cold shoe and let it remain there as long as you wish. The brilliant, highly resistant surface is impervious to water. It will not rust. Naturally such a rust-free surface cannot discolor the clothes which are ironed. Furthermore, because the surface does not rust, it cannot become corroded and pitted. Every housewife knows that a smooth ironing surface is essential for good ironing.

Let your prospect know that the wet sponge, even though it has been there many days, has had no effect on the surface of the ironer shoe.

The Free Towel Demonstration

Have your demonstration ironer out where it can be seen easily by everyone who enters your store. Ask your prospect to sit down and iron a towel. This will acquaint her with the machine and create interest.

Explain each operation to her. Then after the towel is ironed, make her a present of it. This is a valuable good will builder and will create comment and serve to draw many women into your store. This is an effective way to build a live list of ironer prospects. Write Merchandising Department, General Electric Company, Bridgeport, Connecticut, for suggestions.

• • •

Be sure all your sales people—whether they sell inside or outside, know these five simple, easy-to-make, convincing General Electric Washer and Ironer demonstrations. They open the way to bigger and better profits.

200,000,000 *of these Monograms now in American homes.*

H-118—1-31

Washers Folder 711

PLAINTIFF'S Exhibit No. 16e

Turn DEMONSTRATIONS *into* DOLLARS

The Towel Tug Test

and other easy Store Demonstrations that Sell

Home Laundry Equipment

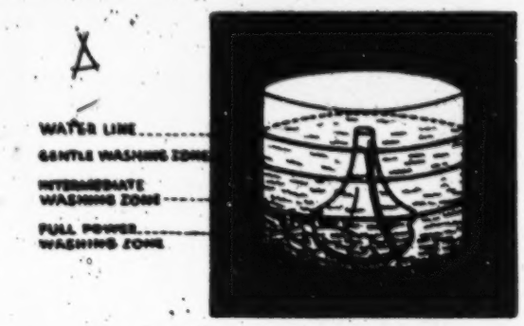
U.S.D.C. W.D.Mo.W.D.
In Equity 2892
Pltf.'s Cross Ex. 65

AN EFFICIENT WASHER SHOULD HAVE WASHING ZONES OF VARYING INTENSITY

The General Electric Washer is not just another washer . . . but a far superior washer . . . because of the ACTIVATOR.

The performance of the ACTIVATOR is demonstrated by the Towel Tug and Activation Tests. You see how clothes are washed as individual pieces . . . without tangling or braiding. You see the multiple principles *work*. You actually *feel* the tug of the varying zones.

In making the Towel Tug Test we must first appreciate that, contrary to general belief, all of the water area in a washer does not wash in the same manner or with the same degree of intensity. By this we mean, some zones are more active than others.



This is logical, because a too gentle or a too vigorous washing alone would not accomplish the desired results —a thoroughly clean wash without unnecessary wear or tear. The ACTIVATOR, because of its unique construction, produces varying zones of washing intensity as is shown in the chart above. This chart shows graphically how these zones are developed in General Electric Washers equipped with ACTIVATORS.

Notice that the Full Power Washing Zone (or the zone of highest washing activity) works at the tips of the ACTIVATOR blades. And that the upper zones have the *desirable* and more gentle activity.

The Towel Tug Test Demonstrates These Varying Washing Zones in the General Electric Washer

These varying zones of washing intensity in the General Electric Washer can be actually *felt* and vividly demonstrated by the Towel Tug Test. This test is simple, quick, dramatic . . . and thoroughly *convincing*.

The Towel Tug Test

Start the ACTIVATOR and fill the tub with 6 or 7 pounds of wash. Then lower a towel (wet or dry) until the end is beneath the water level about two or three inches. A slight but perceptible tug or pull will be felt. This indicates the zone of gentle washing and soaking action.

Then lower the end of the towel to about six inches below the water level. Here, a more distinct and stronger tug will be felt. The end of the towel is now in a zone of greater intensity . . . and more washing activity.

Next lower the towel until the end of it is near the bottom of the tub. Now it is in the *Full Power* Washing Zone and is receiving the strongest washing action. The increased, steady strong tug, like the pull of a 10-lb. trout, shows that the most vigorous action is produced down near the tips of the ACTIVATOR blades.

Plan to use this simple test on every prospect. It dramatizes and shows the ability of the ACTIVATOR which is the "heart" of the G-E Washer. It takes but little time and effort and requires no special equipment. It is a sure way of creating interest and desire.

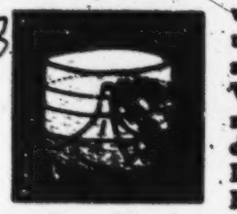
The Activator

You have now proved to the prospect that there are varying zones of washing activity in the G-E Washer. This is a desirable and important factor. Lacking such activation, the clothes in the top of the tub or in the middle and less vigorous zones, would receive only a gentle washing or soaking while the clothes at the lower part of the tub would receive a more vigorous scrubbing than is needed. It is important, therefore, that a washer have varying washing zones and that clothes are *continually circulated* through these zones.

The ACTIVATOR creates direct movement for every article in the tub through the various zones at short intervals—thus assuring that each article is efficiently washed. The constant circulation of the clothes through the three zones does the work.

The Activation Test

To prove this constant movement of clothes through the washing zones of a General Electric Washer, toss a colored towel into a tub containing 5 or 6 lbs. of white wash. Watch the towel swirl, roll over, spin down to the *Full Power* Washing Zone, there to be flexed back and forth by the ACTIVATOR blades while hot sudsy water is forced through the fabric, then shot up to the surface, and again, returned to the Full Power Washing Zone. (A clear glass tub is more effective when making this demonstration. Write Merchandise Department, General Electric Co., Bridgeport, Conn., for details regarding this clear glass tub.)



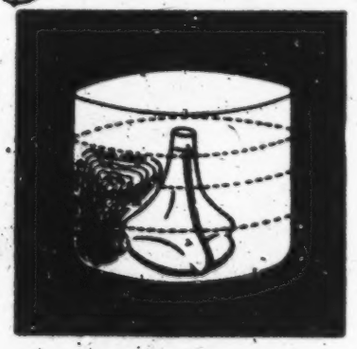
When making the Activation Test have the prospect *look down into the tub*. Call to the prospect's attention the circulation of the clothes through the various zones . . . . up from the bottom of the tub, then down the curves of the ACTIVATOR to the Full Power Washing Zone . . . . then up again . . . . down again . . . . up . . . . down . . . . repeated over and over. (See chart below.)

Also have the prospect watch the movement of the clothes looking through the side of the special glass tub. Call attention to the *roll-over* movement of the clothes through the water similar to that of a barrel rolling across a floor. This roll-over movement flushes water through the fabrics loosening and removing embedded dirt.

This simple activation test clearly shows the six multiple actions of the ACTIVATOR:

1. **Effective washing action starts at water level.**
2. **Sturdy, downward tug sweeps out air bubbles and pulls clothes into Full Power Washing Zone at tips of ACTIVATOR blades.**
3. **Flexing of clothes to loosen embedded dirt particles.**
4. **Forcing of hot sudsy water through clothes by ACTIVATOR blades.**
5. **The swirling water action washes clothes as individual pieces, no braiding.**
6. **Circular roll-over movement of clothes through soapy water with a continuous return to the Full Washing Zone. No dead washing areas.**

Remember that efficient washing should give all the clothes a gentle washing, soaking and flexing to loosen embedded dirt as well as a more vigorous washing action that forces hot sudsy water through the fabric to sweep away the loosened dirt. *The ACTIVATOR gets the dirt.*



PLAINTIFF'S EXHIBIT 16 F.

PLAINTIFF'S
167

Introducing the

ACTIVATOR

as designed by G-E engineers for exclusive use in the new

GENERAL ELECTRIC WASHER

The ACTIVATOR washes clothes as individual pieces without tangling or braiding. One of the six multiple actions of the ACTIVATOR gently flexes the clothes to loosen embedded dirt—another action forces hot suday water through the fabric to remove the loosened dirt. *The ACTIVATOR gets the dirt.*

The amazing performance of the ACTIVATOR is demonstrated by the Towel Tug Test—you see the clothes washed as individual pieces—you actually FEEL the multiple principle work. Come in and see this amazing demonstration—hold the towel yourself.

H-120

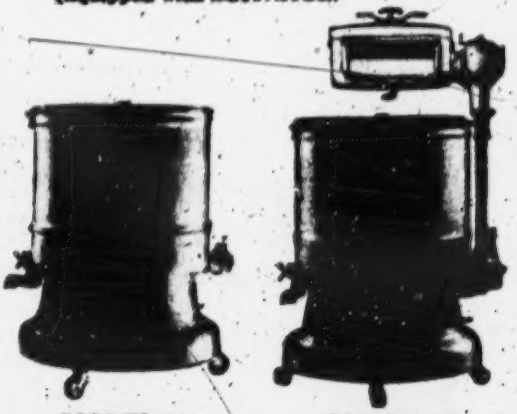
U.S.D.C. W.D.Mo.W.D
In Equity 2892
Pltf.'s Cross Ex 6-C

GENERAL ELECTRIC

HOME LAUNDRY EQUIPMENT

2 Washer Models

(Equipped with ACTIVATOR)



MODEL C

With spinner basket which fits above ACTIVATOR. One handling "wrings" a tub full of clothes while another load is being washed. 9 lb. capacity.

MODEL W

Equipped with powered wringer with large over-size rolls for fast effective work. Wringer pressure instantly released. 8 lb. capacity.

Ironers, too

MODEL R

Slips over wringer post of washer models W and B. Stainless steel shoe.

MODEL T

For table use anywhere. Stainless steel shoe. Rotary—open end for fancy pieces.

$10 DOWN—less than that a month puts a G-E Washer with ACTIVATOR in your home.

OVER

U. S. D. C. W. D. [redacted] W. D.

717

PLAINTIFF'S EXHIBIT 17.

THE MAYTAG COMPANY

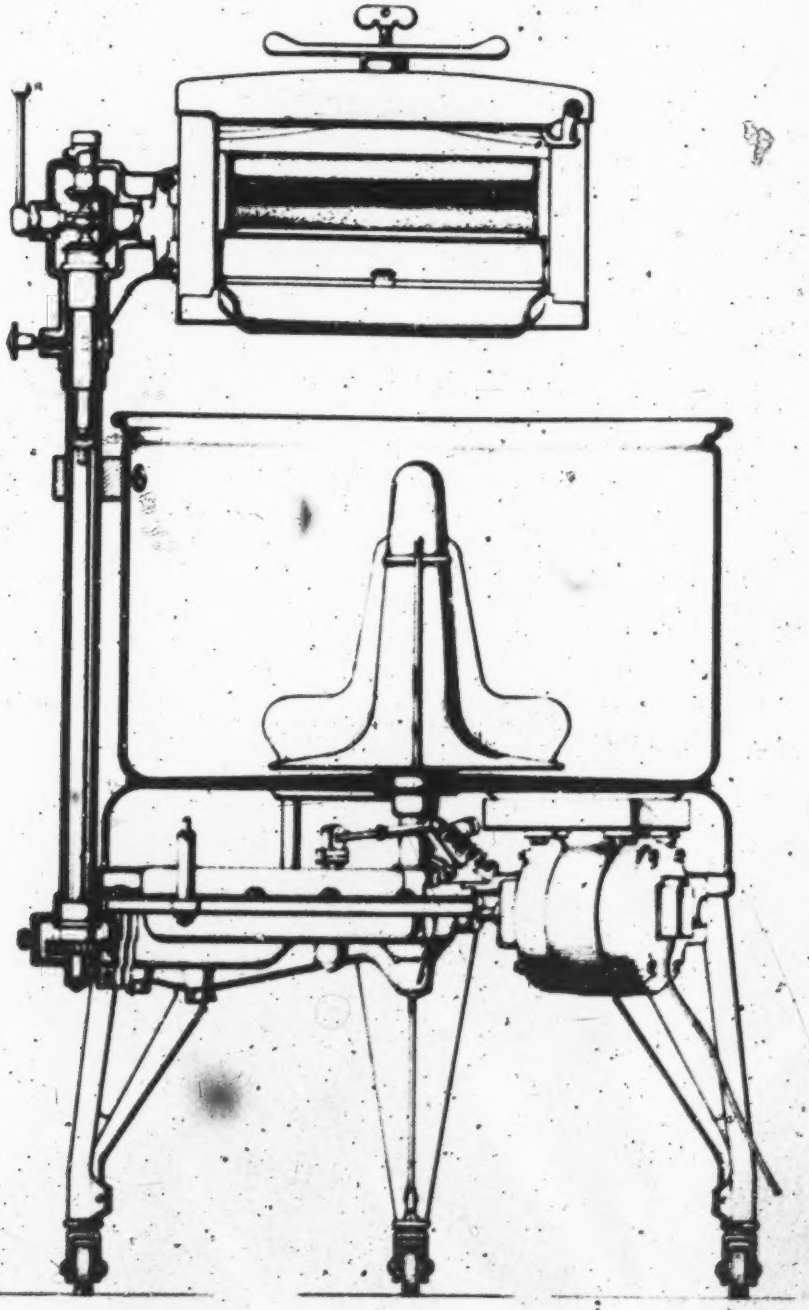
vs.

[redacted] ELECTRIC [redacted] CORPORATION

IN EQUITY 2032

Pl. 17 S. EXH.

DEFENDANT EASY WASHING MACHINE CORPORATION WASHING MACHINE CHARGED TO INFRINGE



1107 (Plaintiff's Exhibits 18-1 to 18-6.)

Plaintiff's Exhibits 18-1 to 18-6 consisted of drawings of Washing Machines, and pursuant to stipulation of counsel at marginal page a of this printed record such exhibits are omitted from the printed record at this place for the reason that they are the same as other exhibits heretofore appearing in this printed record and counsel have directed that the following memorandum as to such exhibits should be inserted in the printed record:

Plaintiff's Exhibit 18-1 is a duplicate of Plaintiff's Exhibit 6-A, reproduced at page 609 of this printed record, supra.

Plaintiff's Exhibit 18-2 is a duplicate of Plaintiff's Exhibit 6-C, reproduced at page 613 of this printed record, supra.

Plaintiff's Exhibit 18-3 is a duplicate of Plaintiff's Exhibit 6-E, reproduced at page 617 of this printed record, supra.

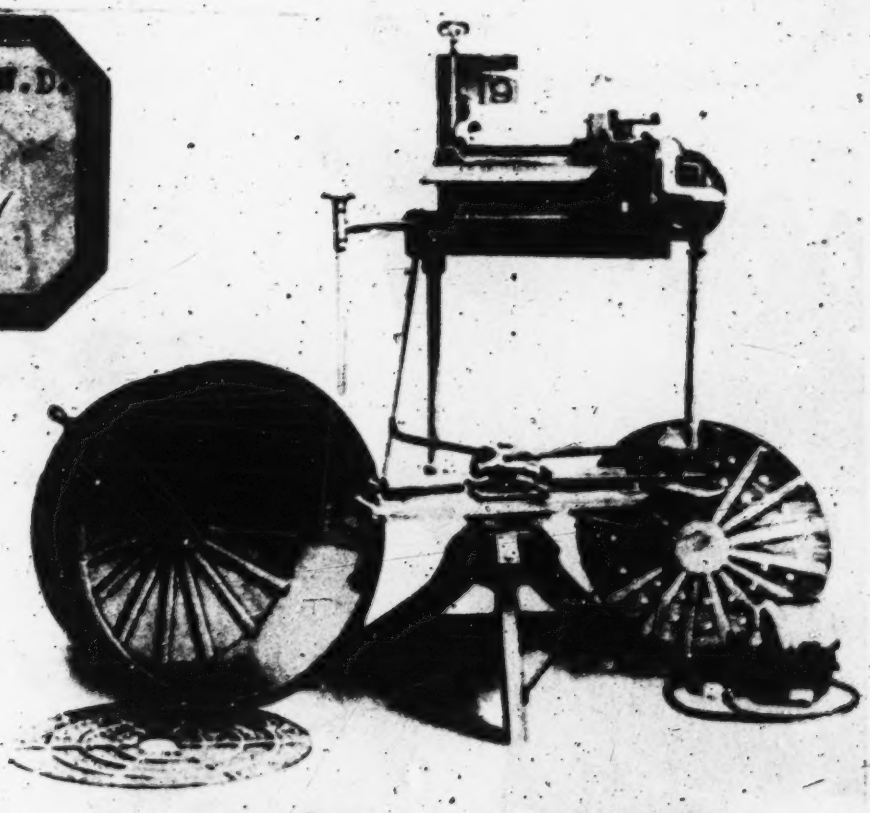
Plaintiff's Exhibit 18-4 consists of two cuts, duplicates of Plaintiff's Exhibits 6-J and 6-K, reproduced at pages 627 and 629 of this printed record, supra.

Plaintiff's Exhibit 18-5 consists of two cuts, duplicates of Plaintiff's Exhibits 6-L and 6-M, reproduced at pages 631 and 633 of this printed record, supra.

Plaintiff's Exhibit 18-6 is a duplicate of Plaintiff's Exhibit 6-N, reproduced at page 635 of this printed record, supra.

PLAINTIFF'S EXHIBIT 19-1.

U.S.D.C. W.D.Mo.W.D.
In Equity 2892
Plaintiffs } Cross
Deposition } Ex #1

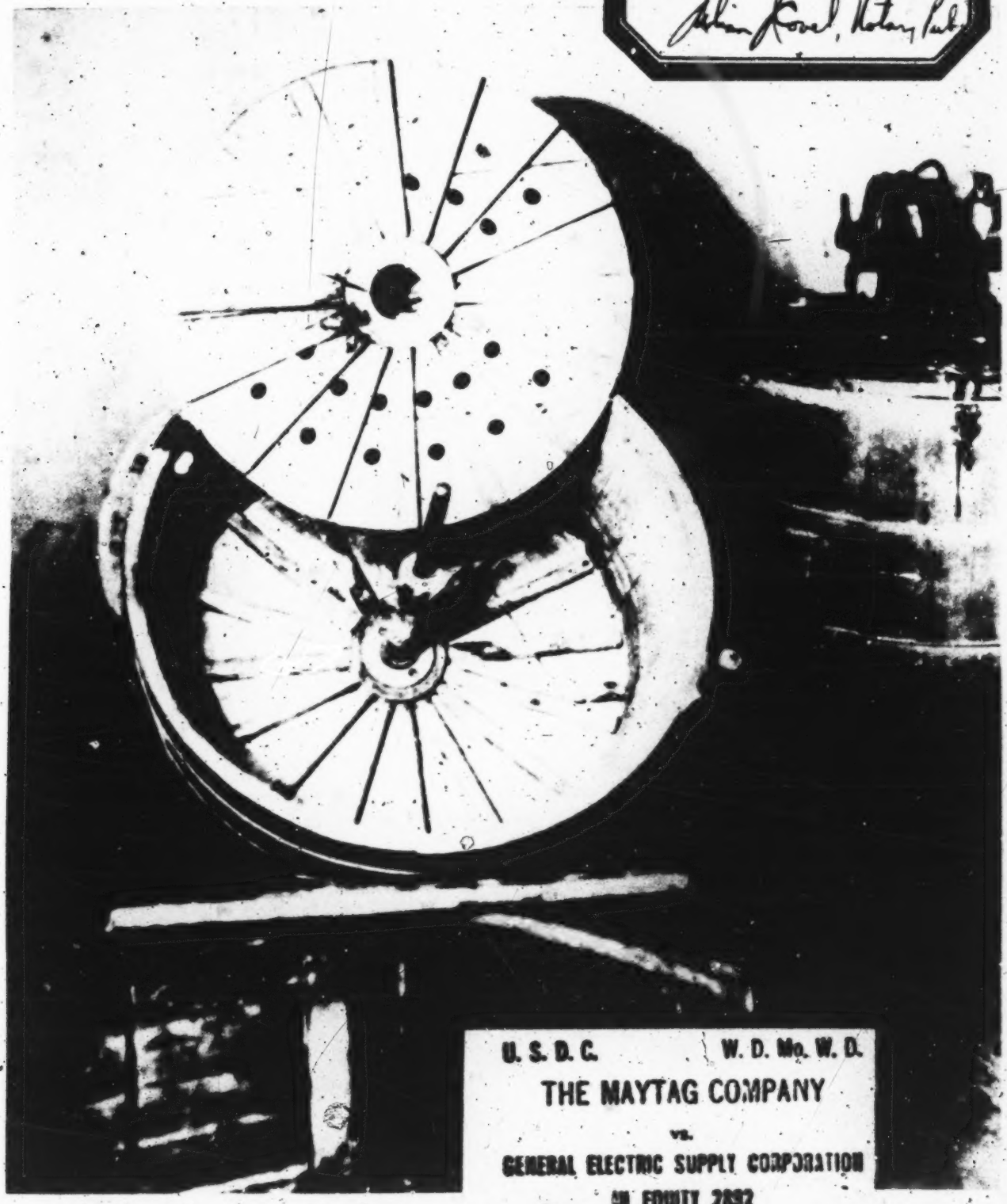


SHOWING THE CONVENIENCE OF MOVING
THE "1900" WASHER

U. S. D. C. W. D. Mo. W. D.
THE MAYTAG COMPANY
vs.
GENERAL ELECTRIC SUPPLY CORPORATION
IN EQUITY 2892
DEFENDANTS EXHIBIT 19

PLAINTIFF'S EXHIBIT 19-2.

U.S.D.C. W.D.Mo.W.D.
In Equity 2892
Pltf's Gross Ex. 3-2
Julian Koval, Notary Pub.



U. S. D. C. W. D. Mo. W. D.
THE MAYTAG COMPANY
vs.
GENERAL ELECTRIC SUPPLY CORPORATION
IN EQUITY 2892
DEFENDANTS EXHIBIT 19-2

1110 (Plaintiff's Exhibit 19-3.)

Plaintiff's Exhibit 19-3 was made a part of the transcript at this place, but same is omitted from the printed record as counsel have stipulated that it is a cut substantially the same as the [—] reproduced at page 719 of this printed record, supra, as Plaintiff's Exhibit 19-1.

PLAINTIFF'S EXHIBIT 20.

723

U. S. D. C. W. D. Mo. W. D.

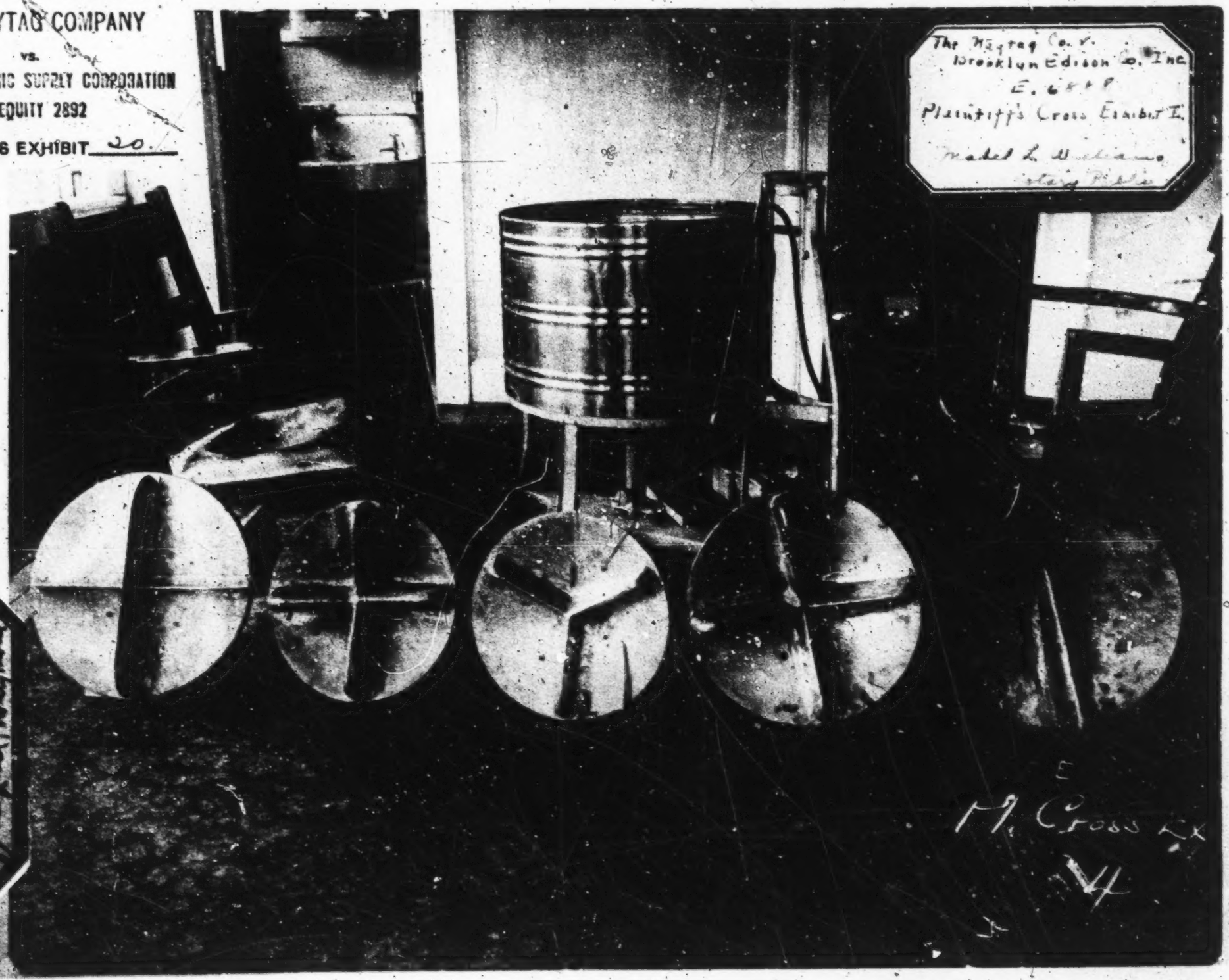
THE MAYTAG COMPANY

vs.

GENERAL ELECTRIC SUPPLY CORPORATION

IN EQUITY 2892

~~DEFENDANTS~~ Pf EXHIBIT 20.



723

327

U. S. D. C. W. D. Mo. W. D.

THE MAYTAG COMPANY

vs.

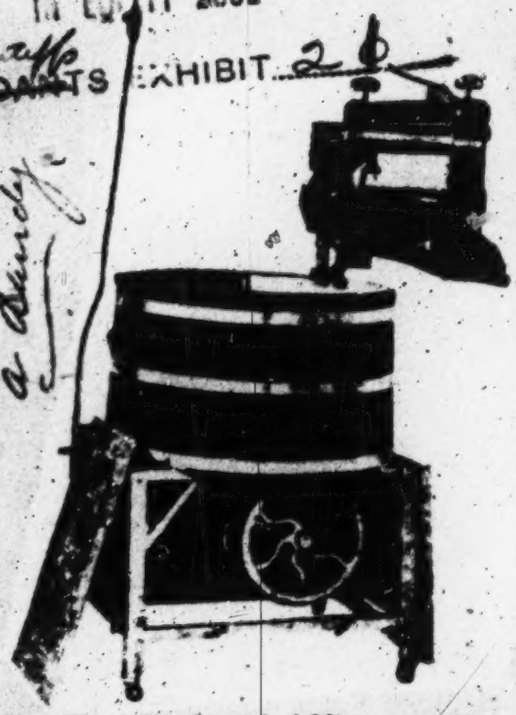
GENERAL ELECTRIC [illegible] CORPORATION

IN EQUITY 2892

Plaintiff's EXHIBIT 21

DEFENDANT'S EXHIBIT 2

Over Bent a Binder



Iron Short Bench, with folding extension for extra tub; Electric Motor, Swinging Wringer, with Cut Gears under tub.

U.S.D.C. W.D.Mo.W.D.
In Equity 2892
Plff. Cross Defendants
Ex. No. 4

It's Easy On Clothes

Thor "Home Model" Type J, Electric Washing Machine gets all the dirt out of the clothes in a scientific way.

Instead of being worked and torn by a "dolly", the clothes are gently carried by the agitator over a rubbing board. The agitator automatically adjusts itself to the amount of clothes in the machine.

It has an independently-operated, safety-swinging, reversible wringer; only two gears, both thoroughly protected; a self-oiling device for the under gear parts; and a Westinghouse Motor.

Write for our Dealer Proposition.

Miller Manufacturing Company

C. P. JENKINS, Mgr.

MEYERSDALE, PA.

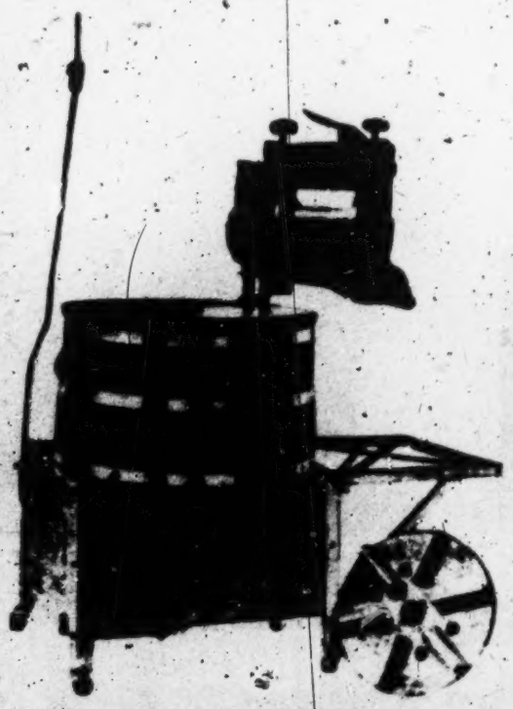
(Over)

6 1112

PLAINTIFF'S EXHIBIT 21.

725

MODEL "J"



Iron Short Bench, with folding extension for extra tub; Electric Motor, Swinging Wringer, with Cut Gears under tub.

Plff. Cross Ex. No. 3 Feby 7 JLB.

"The Home Model"

The Better Kind of Washing Machines.

★ MODEL J. ★

From every section we hear that people are now calling THE MODEL "J" Electric Washer the best we have ever built. In this sense the reports we are continually receiving are really remarkable.

We have not been conscious of an especial effort to make this Model "J" Washer, in specific detail, better than the others.

The improvements we make from time to time are simply in pursuit of our policy always to build a product worthy, in every way, of the confidence we invite our buyers to place in it.

Every Home Model is guaranteed to give satisfaction.

Miller Manufacturing Company

MEYERSDALE, PA.

C. P. JENKINS, Manager. Write for Prices.

(Over)

6 1113

1114 (Plaintiff's Exhibit 22 (also marked Plaintiff's Cross Deposition Exhibit 10.)

(Letters Patent No. 738,560 to W. S. Miller, September 8, 1903.)

728 No. 738,560. PATENTED SEPT. 8, 1903.

W. S. MILLER.

WASHING MACHINE.

APPLICATION FILED MAY 23, 1903.

NO MODEL.

Fig. 1

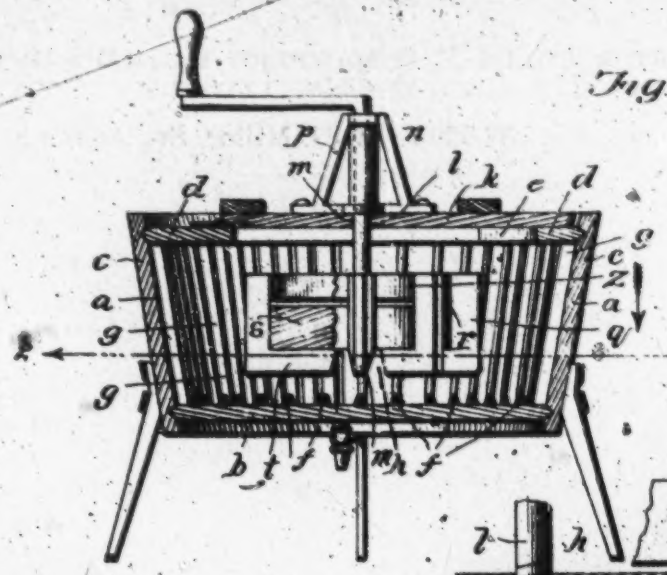


Fig. 4.

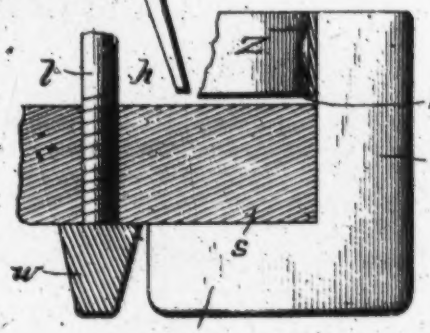


Fig. 2.

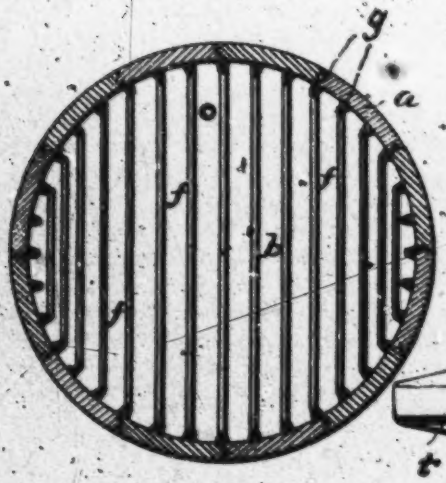
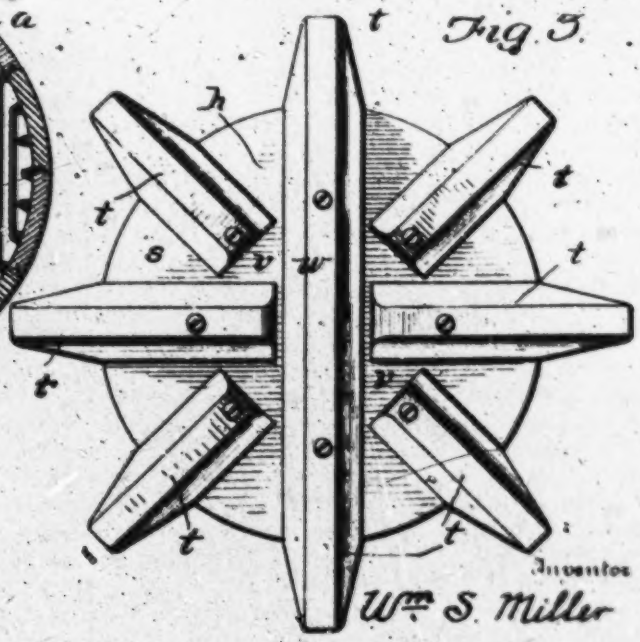


Fig. 3.



Witnesses

R. A. Boswell.

Geo. M. Anderson

Inventor

Wm. S. Miller

By E. W. Anderson

Atty

No. 738,560. Patented September 8, 1903.

UNITED STATES PATENT OFFICE.

WILLIAM S. MILLER, OF MEYERSDALE, PENNSYLVANIA.

WASHING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 738,560, dated September 8, 1903.

Application filed May 23, 1903. Serial No. 158,478. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM S. MILLER, a citizen of the United States, and a resident of Meyersdale, in the county of Somerset and State of Pennsylvania, have made a certain new and useful Invention in Washing-Machines; and I do declare the following to be a full, clear, and exact description of the same, such as will enable others skilled in the art to which it appertains to make and use the invention, reference being had to the accompanying drawings, and to letters of reference marked thereon, which form a part of this specification.

Figure 1 is a central vertical section of the invention. Fig. 2 is a section on the line 2 2, Fig. 1, with the agitator removed. Fig. 3 is a bottom plan view of the agitator. Fig. 4 is a fragmentary detail view, partly in section, of a portion of the agitator.

The invention relates to washing-machines; and it consists in the novel construction and combinations of parts, as hereinafter set forth.

In the accompanying drawings the letter *a* designates the receptacle or tub having a bottom *b*, side wall *c*, and top *d*, the latter being secured to the upper portion of the side wall and being provided with an opening *e* for the introduction of the agitator, the clothes or articles to be washed, and the water. To let out the water, a waste-opening having a stop or valve is provided in the bottom portion of the tub. The upper surface of the bottom of the tub is provided with a series of small ribs *f*, which are placed near each other with narrow intervals between these ribs, being usually of somewhat narrowed form from their bases to their tops or upper surfaces. The side wall of the tub on its inner surface is also provided with a series of ribs *g*, extending upward from the bottom, said ribs having small intervals between them. These ribs are also preferably designed to have their bases wider than their inner surfaces, being somewhat tapering or beveled on their sides.

The cover is indicated at *h*. It is hinged to the top of the tub and is of sufficient strength and extent to carry the rotary agitator *k*, which is provided with a stem or shaft *l*, which extends through a bearing in the center of the cover, said bearing consisting not only of the opening *m* in the center of the cover, but also of a casting *n*, which is secured by its arms *p* to the top of the cover and projects above the latter sufficiently to give firmness of position to the shaft of the agitator. The journal portion of the latter is, however, somewhat longer than the bearing in order that it shall be capable of a certain amount of vertical or up-and-down adjustment while in operation in order to accommodate itself easily to the quantity of the articles being washed and also to the inequalities of thickness thereof, which arise constantly from their change of position. The bottom of the stem of the agitator is firmly secured in or to the center of the disk *s*, the bottom of which is provided with a series of deep radial trapezoidal ribs *t*, between the inner ends of which are openings *v*. These ribs have their sides inclined toward each other from their bases to their bottoms, so that the intervals between them will become narrower toward the disk-bottom, thereby facilitating the rubbing action of the ribs. Around the side or circumference of the disk are the upright trapezoidal ribs *q*, of the same depth as the radial ribs and also arranged in series and being preferably connected each at its lower end by careful jointing or mitering (not shown) to the radial ribs of the disk-bottom. In this way each rib is, in effect, of L form, the circumferential ribs serving to direct the water toward and into the channels between the radial ribs of the disk-bottom. These circumferential ribs are designed to extend upward to the bottom of the cover when the agitator is raised to its highest position, and in order to give them proper security of position and due firmness, as well as to prevent the articles being washed from moving past them to the middle of the agitator over its disk-bottom, the agitator is provided with an annular band or hoop *x* above the circumferential portion of the disk and within the series of upright ribs. To this band or hoop the upper portions of these upright ribs are firmly attached. The rubbing is effected by the action of the side and bottom ribs of the agitator in conjunction with the side and bottom ribs of the tub, and this rubbing, in connection with the work of the

water as the agitator is turned within the tub and the squeezing action effected by the up-and-down movement of the agitator, is designed to cleanse the articles in the tub in a satisfactory manner. The top of the stem of the agitator is provided with a crank-handle or other device for turning. When the cover is closed, the agitator is in proper centralized position in the tub. When, however, the cover is raised, the agitator is entirely withdrawn from the tub, so that free access can be had to its interior. When raised, the water in the agitator escapes freely through an opening, as at *r*, in its lower portion, the opening in the construction shown being between the hoop and the disk-bottom.

It is designed in this washing-machine to make the operating-ribs of the agitator much larger in cross-section than those of the bottom and side of the tub—that is to say, they project outward from their bases to a greater extent, even double or more than double the extent of the ribs of the tub itself. In this way they serve a better purpose in their action in moving the water and the clothes.

Having described this invention, what I claim, and desire to secure by Letters Patent, is—

1. In a washing-machine, the rotary agitator, consisting of the disk-bottom, its operating-stem, and the annular band above its circumferential portion, the deep radial ribs on the disk-bottom, and the similar upright side ribs connected at their lower ends with said radial ribs, and at their upper ends to said annular band, substantially as specified.

2. In a washing-machine, the combination with a tub, having the interior surfaces of its bottom and side wall provided with series of ribs, and the hinged cover of said tub having a central upward-projecting bearing, of the rotary-agitator, having deep L-form ribs on its bottom and side, and a strengthening-band above its bottom, and the reciprocating stem-journal longer than said bearing, substantially as specified.

In testimony whereof I affix my signature in presence of two witnesses.

WILLIAM S. MILLER.

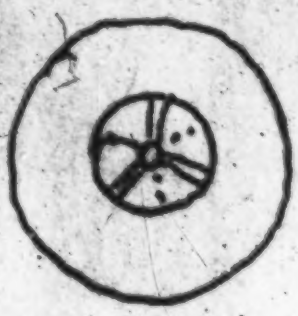
Witnesses:

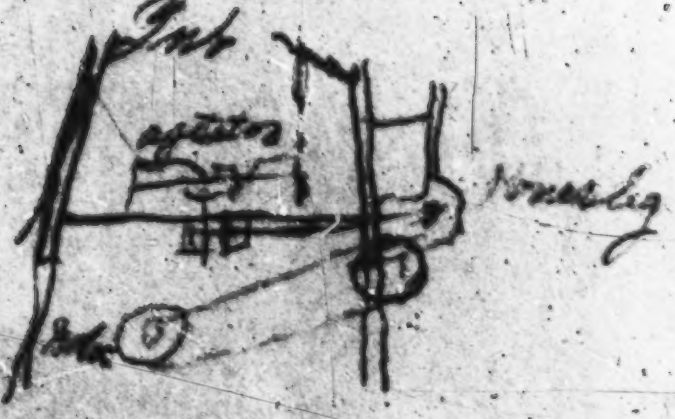
ELLSWORTH G. NAYLOR,

FULTON N. SHIPLEY.

PLAINTIFF'S EXHIBIT 23.

Miller Sketch 1920 - Agitator





E6888
United States District Court
Eastern District of New York.
Exhibit 171 in evidence
Date 4/24/35
Clerk
Deputy Clerk

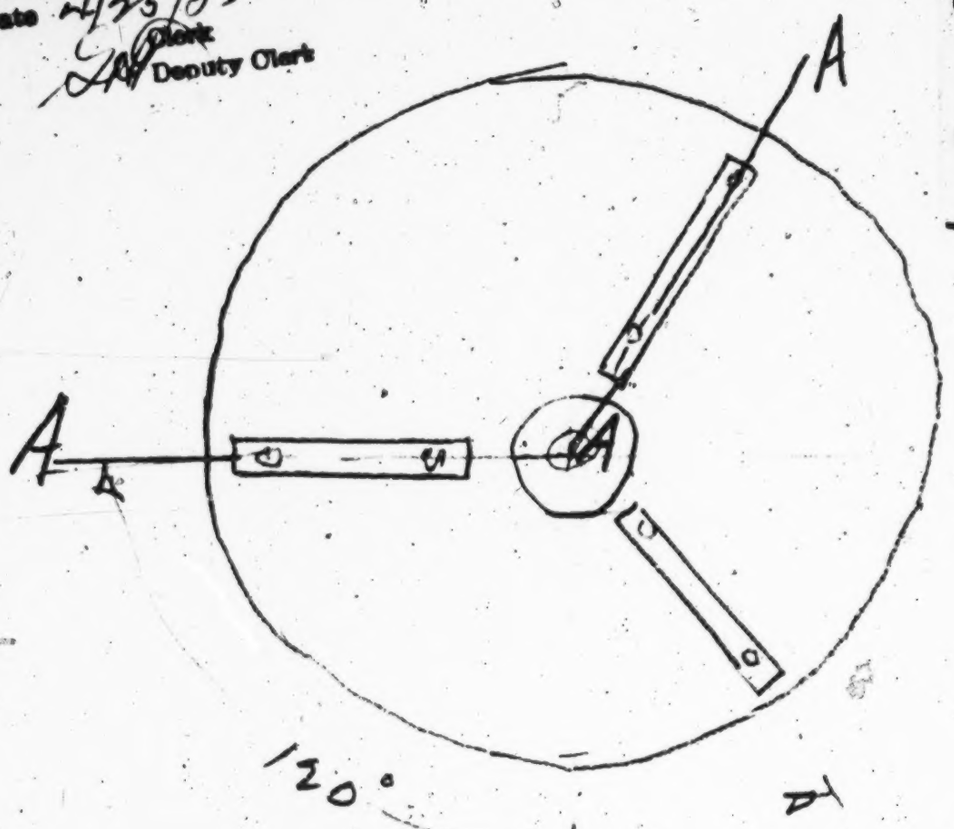
W. D. Mo. W. D.
U. S. D. C.
THE MAYTAG COMPANY
vs.
GENERAL ELECTRIC SUPPLY CORPORATION
IN EQUITY 2892
PLAINTIFF'S EXHIBIT 23

66 88

United States District Court
Eastern District of New York.
Exhibit 176 in evidence
Date 4/23/31
Clerk
Deputy Clerk

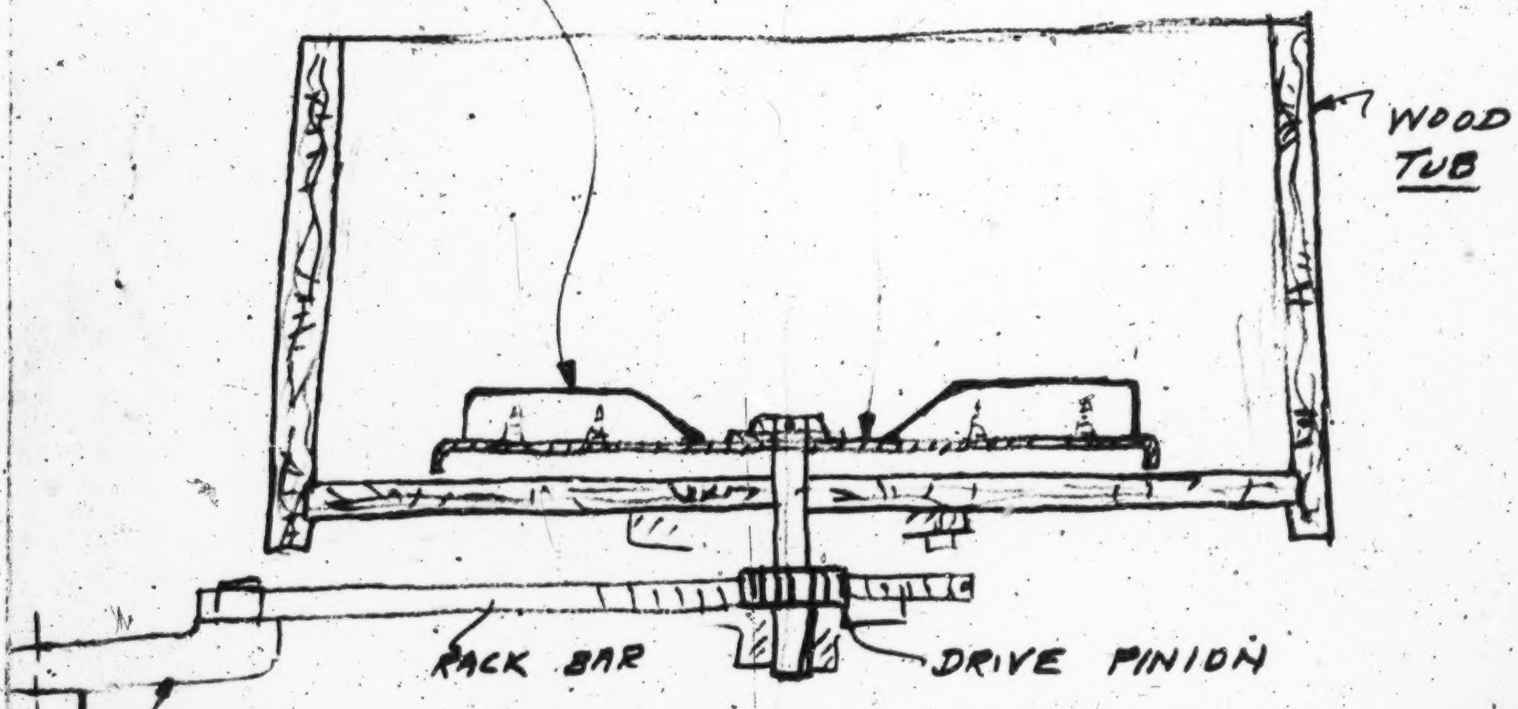
Dave Moore

U. S. D. C. W. D. Mo. W. D.
THE MAYTAG COMPANY
vs.
GENERAL ELECTRIC SUPPLY CORPORATION
IN EQUITY 2892
PL
~~DEFENDANTS~~ EXHIBIT 24



SHEET STEEL DISC

WOOD BLADES



CROSS SECTION A-A-A

PLAINTIFF'S EXHIBIT 24.

PLAINTIFF'S EXHIBIT 25.

LAW OFFICE OF
PARKINSON & LANE

ROBERT H. PARKINSON
WALLACE B. LANE
GEORGE MANELE
FREDERICK P. MASON
MERRILL M. BLACKBURN
RALPH N. SNYDER

MARQUETTE BUILDING
CHICAGO

December 9, 1919.

The Maytag Company,
Newton, Iowa.

Gentlemen:-

Attention Mr. B. H. Maytag

As a result of the careful search made through the Patent Office records to obtain for you copies of all United States patents on Mangles for home use, the following pertinent patents have been discovered:

16,887	80,019
21,450	96,646
20,002	97,245
21,044	96,359
234	96,360
26,005	96,361
26,227	93,491
25,413	91,095
25,656	144,671
27,890	94,206
30,812	87,457
32,001	118,654
35,301	114,863
40,022	127,971
45,938	145,910
46,265	139,201
70,766	139,574
51,452	142,997
47,708	157,245
47,152	153,491
54,643	166,108
61,018	169,762
69,513	160,851
65,154	174,403
67,695	187,504
79,189	178,164

U.S.D.C. W.D. MO. E.D.
THE MAYTAG COMPANY
GENERAL ELECTRIC SUPPLY CORP. ET AL
IN EQUITY 2282
DEFENDANTS EXHIBIT 25

PLAINTIFF'S EXHIBIT 25.

188,685
205,168
199,677
204,701
216,320
220,866
214,448
233,031
230,719
247,202
238,657
254,927
289,054
329,250
316,838
314,269
543,636
346,427
506,436
363,906
369,675
379,935
412,156
408,477
417,819
438,206
436,265

419,795
421,144
486,222
476,004
482,410
491,455
494,277
516,566
575,614
570,404
578,017
660,301
667,058
672,583
700,062
738,448
750,930
771,291
773,448
785,770
896,174
912,872
937,102
1,001,136
1,059,619
1,075,982
1,155,179
1,209,081
1,234,503

I am forwarding a copy of each of these patents to you herewith, with the exception of the following, which have been reported by the Patent Office to be exhausted:

45,938
234-A.I.May 3, 1859 - Cummings
69,813
91,095
87,457
139,201
238,667
254,927
346,427
379,935
419,795
660,301
667,058
738,448

1130

PLAINTIFF'S EXHIBIT 25.

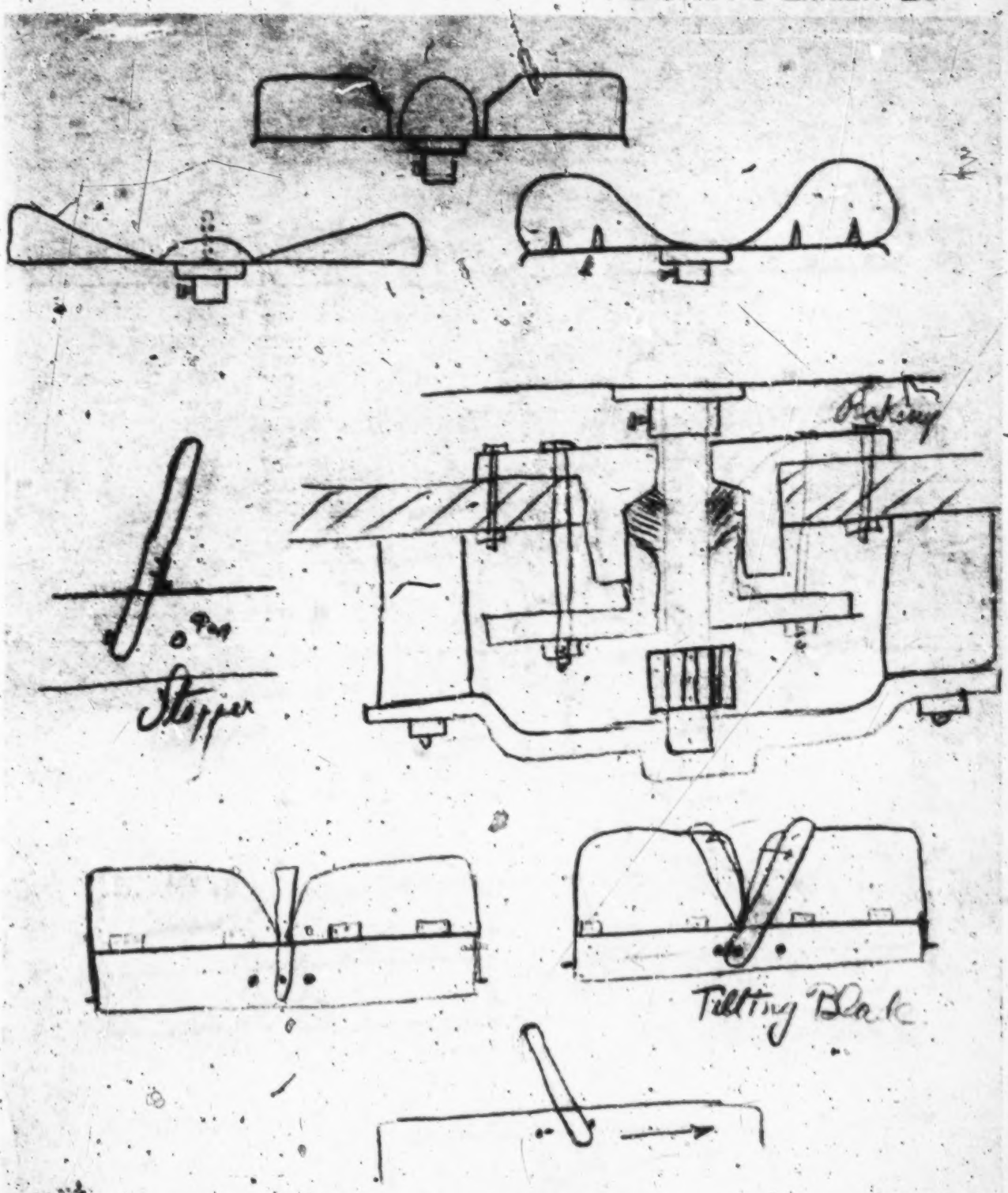
These exhausted patents have been ordered reprinted, and will be forwarded to us and sent to you as soon as reprinted. The Office is behind in its work in this regard, and it may require from eight to ten weeks to secure further copies of these exhausted patents.

Very truly yours,

Wallace R. Lane.

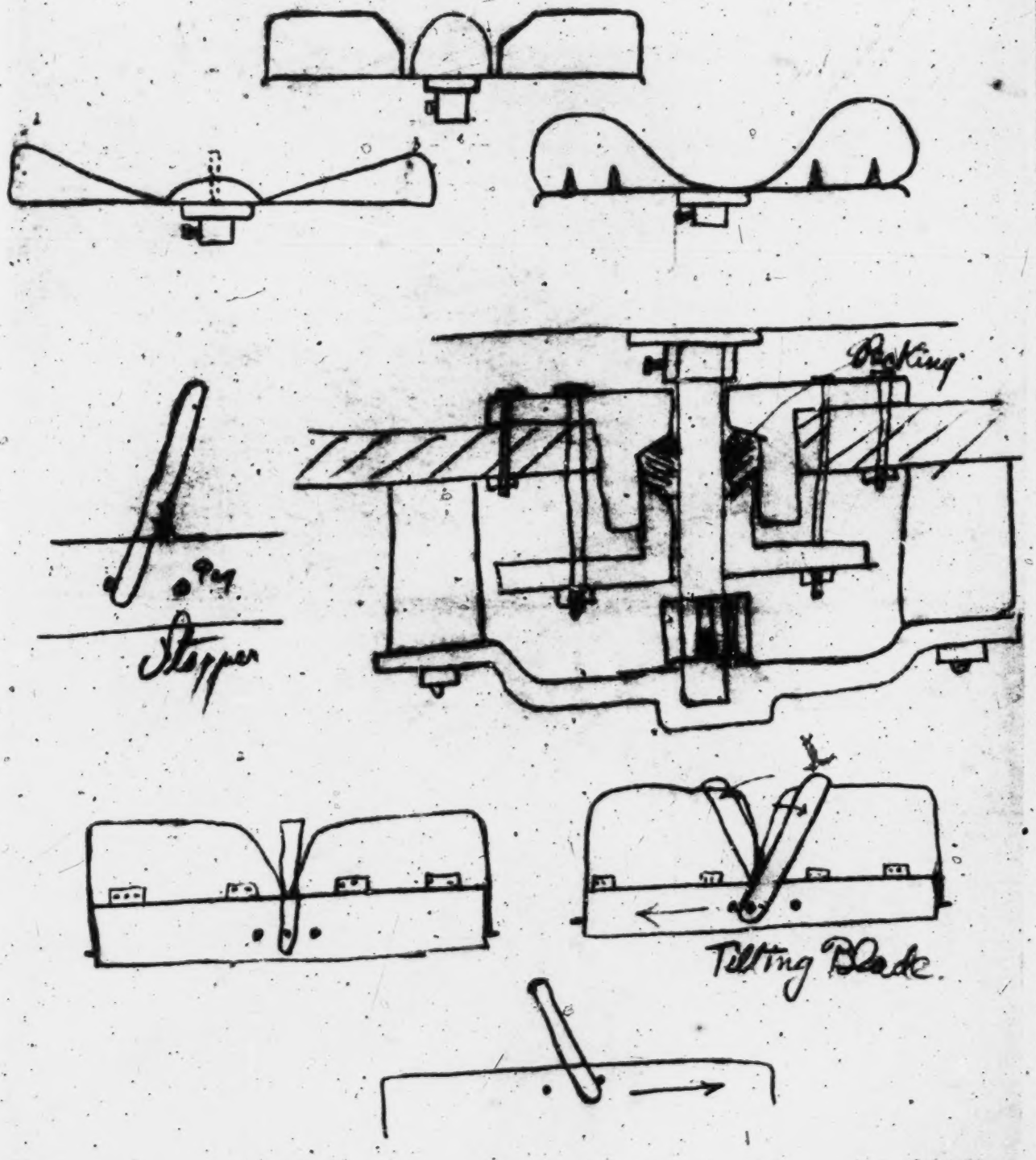
LRL:/O

PLAINTIFF'S EXHIBIT 25.



Dec 19 1914 Edward Foster D. L. Moore Dec 29-1914

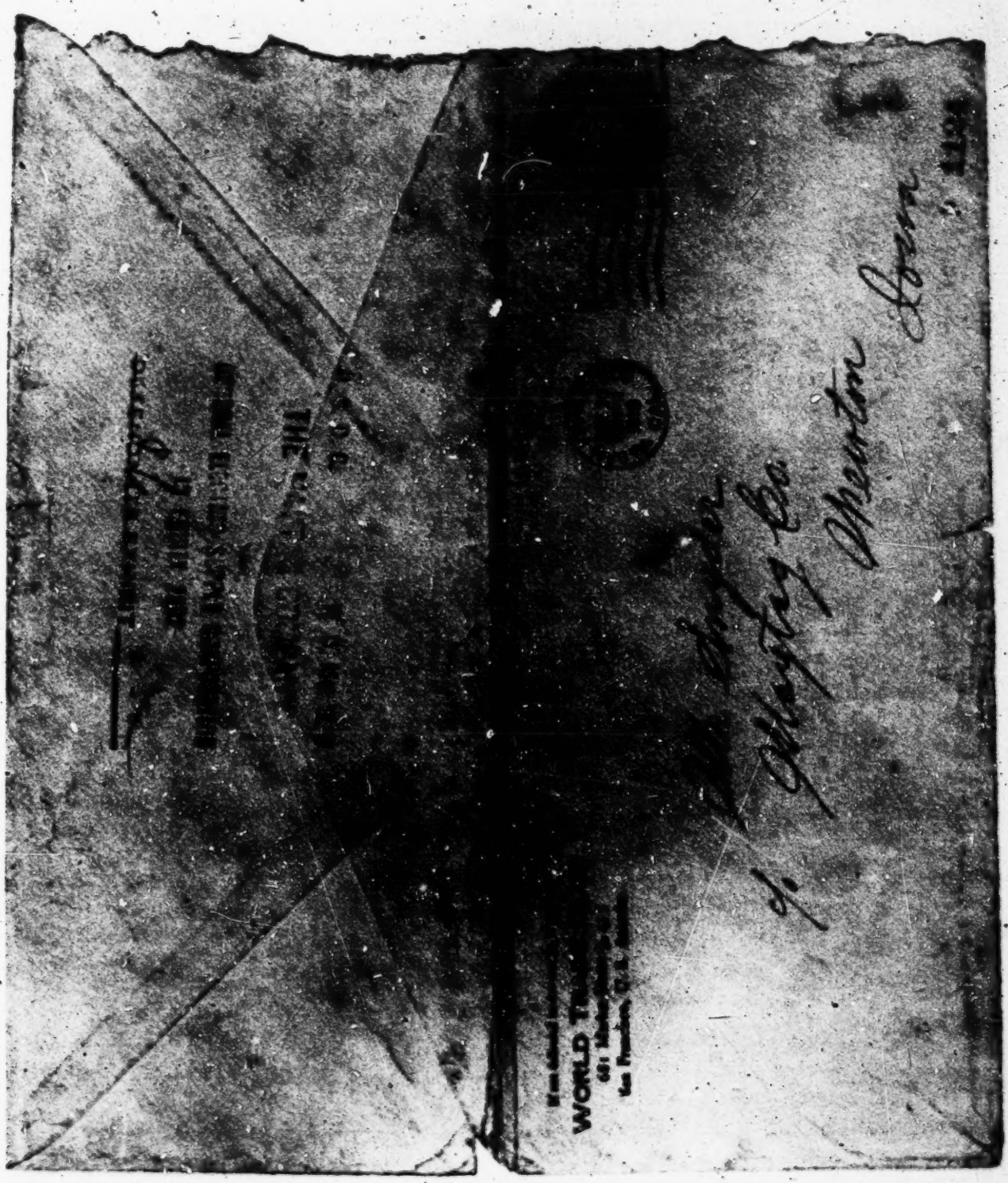
PLAINTIFF'S EXHIBIT 25.



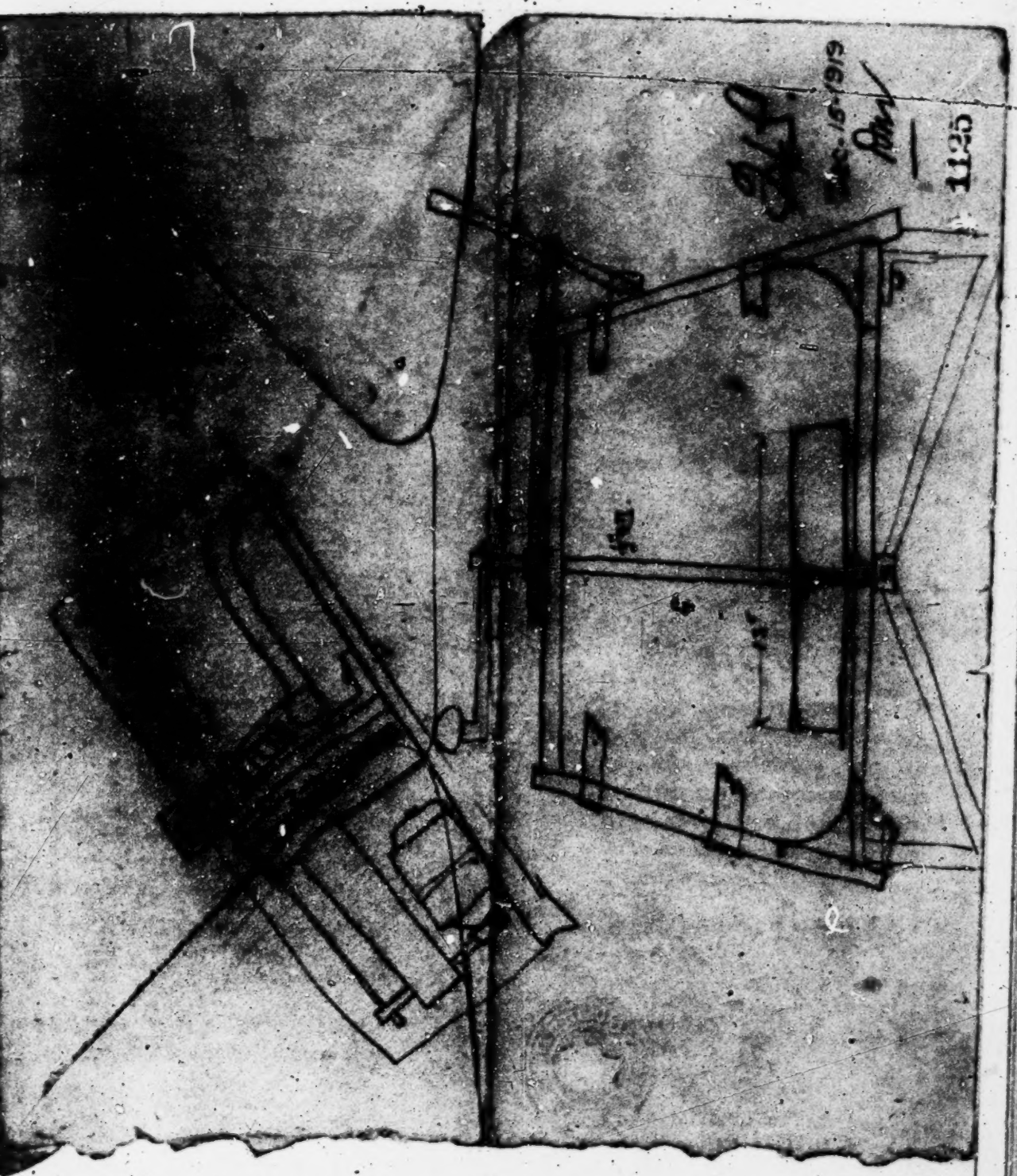
1123

Dec 19 1919 Howard Tudor D L Masar Dec-19-1919

PLAINTIFF'S EXHIBIT 25 A.



PLAINTIFF'S EXHIBIT 25 A.



PART OF PLAINTIFF'S EXHIBIT 25 A.

WORLD TRADE CLUB

SAN FRANCISCO, U. S. AMERICA

29 March, 1919

1120

A personal Word from
WORLD TRADE CLUB:-

A simple and understandable letter about meter-liter-gram is handed you herewith, that you may appreciate to the fullest the advantages to be derived from their adoption by the English Speaking peoples - America and Britannia are the only civilized nations that have not yet adopted these standards - and that you may thereupon lend the weight of your influence to secure their early world wide use.

As it will benefit all human kind, it deserves your consideration and whole-hearted support. May we ask that you do not pass the matter lightly aside as one of those things for "the other fellow" to do, and that after reading our letter that you follow the suggestion expressed on page 16.

Respectfully,

Secretary-Treasurer World Trade Club

British Premier David Lloyd George
British Legislators
Commissions or Committees on Weights, Measures, Coins
Houses of Parliament
London, British Isles

The undersigned endorses {legislation / proclamation / orders in council} *that will bring about the exclusive use of Meter-Liter-Gram by the British Isles.*

Name.....

Address.....

.....

.....

U. S. American President Woodrow Wilson
U. S. American Legislators
Committees on Weights, Measures, Coins
Washington, D. C., U. S. America

The undersigned endorses {legislation / proclamation / orders in council} *that will bring about the exclusive use of Meter-Liter-Gram by the United States of America.*

Name.....

Address.....

.....

E4.0

World's Greatest Engineer
James Watt

World electric science has named the electric unit of power

Watt

thereby honoring James Watt, whose genius made possible to humankind the steam engine, steamboat, steam railway, steam pump, and steam turbine. He thought his greatest work the Watt Measuring System, whose three principal units became

Meter—Liter—Gram

★

A simple story, simply told

U. S. D. C. W. D. Mo. W. D.
THE MAYTAG COMPANY
vs.
GENERAL ELECTRIC SUPPLY CORPORATION
IN EQUITY 2892
DEFENDANTS EXHIBIT 25a

Letter to Lord Balfour

Chairman commission on Weights, Measures, Coinage in Mother Britannia's Parliament

O yez! O yez!

★

Our Weights and Measures Forced Onto Us By Germans

STRANGE as it may seem, the present coinage of the British Isles as well as the weights and measures of both the British Isles and of America are German.

The British pounds, both sterling and avoirdupois, originated with the old German Osterling Hanseatic League, which for hundreds of years controlled the trade of England. Indeed, the dominance of the Germans continued until a competent business manager ousted the German Hanse League from England—a patriotic work—and it was a woman who did it: Elizabeth.

The Germans forced these old standards on the British[1] who in their turn landed them on America. America and Britannia were one until 1776.

What is still more remarkable is that America and Britannia continue to use these old German tools after Germany herself has scrapt them, and adopted (1871) the simplest decimal system of quantity expression ever known to humankind—the application of the decimal to weights and measures, which was the invention of that truly great Briton, James Watt, 1783.

Yet Britannia and America have lagged behind the rest of the civilized world by neglecting to adopt a system of quantity expression which is so simple that the average child of 10 can learn its essential features in 10 minutes.

Is it not time that we, as well as the Germans, should scrap the obsolete standards of war and trade, so complicated, difficult to learn and use?

Yes, the time has come when both of these

[1]German Hanse-League, by H. Zimmern, pp. 104, 186; Outline History of German Hanse League, by Cornelius Walford, p. 61. From Vol. 9, Transactions Royal British Historical Society. The Hidden Hand in English History, by Ian D. Colvin, author of The Germans in England, p. X, XVII, XVIII, 2, 10, 15, 24, 29, 32, 45, 67, 89, 136, 182, 209, 227. Hanse League was for probably 500 years the only world trade club in the world. Therefore its influence on weights, measures, coin.

World War Standardization and Peace

nations must align themselves with the rest of the civilized world. They are too progressive, too patriotic, too democratic, too scientific, too forward-looking to hold aloof from civilization and to perpetuate methods so wasteful, and so inadequate, so hazardous to the life of the nation alike in war and peace.

It would be comical if its issues were not so tragic that Britannia and America use the old, scrapt German jumble, while Germany uses ours—the efficient decimal-scientific, automatic system 1,000 times more effective than that the Germans scrapt.

We, too, must adopt meter-liter-gram that have come into well nigh world-wide use, and are so badly needed by Britannia-America.

For the world to adopt anything for world-wide, everybody's everyday use requires that it be simple—extremely simple.

All the world has adopted the alphabet of letters for written expression, each people in its own language.

All the world has adopted the Arabic numerals, 1234567890, for its mathematical computation.[2]

All the civilized world has adopted the metric units to express its weights and measures, meter-liter-gram, with the single exception of U. S. America and Britannia.

The metric system—the Watt scientific measuring system—is the most simple and the most practical, an immeasurable advance on the weights and measures that now handicap the business relations and education of Britannia and America.

It is a system of weights and measures based on decimal computation, just as is the American decimal metric dollar.

The metric system has only 4 principal units—dollar-meter-liter-gram—and they can be multiplied by 10, 100, 1000, or divided into 10ths, 100ths, 1000ths, in the same manner that we multiply or divide decimal metric money.

Dollar-meter-liter-gram are simply *names* to indicate whether the computation refers to money, length, mass or weight.

Use and expression. We may use the same terms to express meters, liters and grams as we do to express dollars.

[2]See *all* keyboards of *all* typewriters in *all* languages: 1234567890.

PART OF PLAINTIFF'S EXHIBIT 25 A.

1.111 is exprest as one dollar, one 10 cent, one cent, one mill.

1.111 is exprest as one METR, one DECI-meter, one CENT-imeter, one MILL-imeter.

1.111 is exprest as one liter, one DECI-liter, one CENT-iliter, one MILL-iliter.

1.111 is exprest as one gram, one DECI-gram, one CENT-igram, one MILL-igram.

The average child of 10, who knows the metric decimal dollar and its decimal sub-divisions, can learn in 10 minutes as much of the metric system as 90 per cent of all the people ever have occasion to use.

Just as you multiply and divide the dollar by 10-100-1000, so do you multiply and divide meters, liters, grams.

And as to definitions:—KILO is Greek for 1000, HECTO is Greek for 100, DEKA is Greek for 10. That is all.

These terms are used by others—we need not use them. In practical work, we may speak of 10,000 meters or 10,000,000 liters in the same way that we speak of 10,000 or 10,000,000 dollars.

It is all very simple. The question arises: How has such a unified system originated? How has the world so skilfully worked from the complex to the simple?

U. S. American Bureau of Standards, Director S. W. Stratton, tells, in an admirable article in Americana, the Scientific American Encyclopedia, in sense 1%—read the other 99% in Americana—metric system—the world's *one* system.

The metric system of weights and measures was the result of scores of years of research, anxious agitation and indefatigable labor.

Each locality and industry had its own weights and measures which crudely served local needs and primitive conditions.* With increasing intercourse, this diversity of units and standards proved confusing and intolerable and demands for *one* simple system for world-wide use grew steadily to a climax about 1782.

James Watt suggested it. The great British inventor was greatly handicapped by the lack of the use by others of world-wide terms for the expression of quantities.

At that time every nation had its own local measures, all differing—a non-Watt hell. Watt's scientific and practical mind devised one simple decimal method which he submitted to various

countries in 1783, and it was this system that became the metric system.

Talleyrand, the great French statesman, saw at once its immense practical value, simplicity, uniformity—world oneness. He caused it to be adopted in France, and France was soon followed by 33 other nations.

In his first message to Congress, George Washington said:

"A *uniformity* of the weights and measures of the country is among the important objects submitted to you by the constitution and if it can be derived from a standard at once invariable and *universal*, it must be no less honorable to the public council than conducive to the public convenience."

Thomas Jefferson appreciated its simplicity and practicability, and urged its adoption by U. S. America. America accepted it as the basis of her money, 1786, thus leading the world in metric money, but unfortunately neglected to adopt the other 3 principal units—meter-liter-gram.

In 1816 James Madison brought the matter of standards to the attention of Congress and a committee reported in favor of Jefferson's best decimal plan, but it was not done. In 1821, J. Q. Adams, Secretary of State, reported in favor of the metric system but it was not done. In 1866 Charles Sumner did the same with same result and so up to the World War, when the U. S. American War Department adopted the metric system for use abroad, as had Britannia, 1914.

British House of Commons voted to adopt the metric system exclusively, but the House of Lords rejected it. So in these 2 countries alone, the ancient, cumbersome, obsolete and discarded German jumble for the expression of quantity still hampers, handicaps and legicaps these 2 peoples, who think themselves up to date, forward looking.*

*Countries which have all of them more or less completely adopted the metric units are these 15: Argentina 1863, Austria, Adelia, Algeria, Albania, Arabia, Andorra, Assam, Armenia, Anatolia, Azores, Abyssinia, Brazil 1873, Belgium, Bolivia, Bulgaria, Borneo, Bali, British Honduras, Bavaria, Russia, Bokhara, Balearics, Bulawian, Canada, Ceylon, China (the Chinese Government has definitely decided gradually to turn its 436,000,000 to exclusive use of meter-liter-gram—it is the standard of 28 ports now), Chili, Colombia, Costa Rica, Canada, Canada-Slave, Cuba, Carolina

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PART OF PLAINTIFF'S EXHIBIT 25 A.

As we have already noted, Germany has had everything metrically standardized since 1871, so that in the world war practically every German detail was instantly interchangeable, and they fitted and worked together. *Without this automatic unity and simplicity there could have been no such great efficiency in the productive and military co-ordination of Germany.*

The Allies, on the contrary, had no such interchangeable uniformity. The metric standards of France, Italy, Russia, Rumania, Greece, Belgium, Montenegro, Portugal, Serbia, and the rest—23 fighting allies and 7 who had broken off diplomatic relations with Germany, including the nations of Central and South America, that is to say some 30 of the allies—were *not* interchangeable with the British and American weights and measures. Even British and American measures were not interchangeable,[6] with the result that great and grave difficulties, long costly delays,

Islands, Cambodia, Cochin China, Dutch Celibes, Canaries, Cyprus, Corsica, Crete, Denmark, Dalmatia, Dahomey, Dobrudja, Damaraland, Egypt, Ecuador 1856, Portuguese East Africa, Eritrea, France 1799, Finland, Formosa, Faroe Islands, Filipines, Germany 1871, Greece, Guatemala, Greenland, Guiana, (French), Guiana (British), Guiana (Dutch), Guiana (Portuguese), German East Africa, German West Africa, Togoland, German Borneo, Guam, Hungary, Hongkong, Holland, Haiti, Honduras, Herzegovina, Italy, Iceland, Ivory Coast (French), India (India is the source of origin of the decimal science of positional decimal arithmetic; her standards of weights and measures are metric units—the Ser is 1000 grams; the Ser of water is the liter exactly), Indo China (French), Japan, Java, Jugo Slovia, Juan-Fernandez, Kamerun, Korea, Kongo (French), Kongo (Belgian), Kongo (Portuguese), Khiva, Lithuania, Liberia, Luxemburg, Lombok, Marshall Isles, Mexico 1856, Morocco, Morovia, Montenegro, Mauritius, Monte Carlo, Martinique, Madura, Moluccas, Macao, Madeira, Malay States, Namaland, Norway, New Guinea, Nicaragua, New Granada 1863, Nigeria, Newfoundland, Ovo (Spanish), Odrar, Peru, Poland, Palestine, Paraguay, Patagonia, Panama, Porto Rico, Portugal, Pescadores, Rutein, Ruthenia, Rhodes, Rumania, Siberia, Salvador, San Domingo, Serbia, Spain, Switzerland 1875, Samoa, Samoa (German), Samoa, Sardinia, Sicily, Siam, Sumatra, St. Lucia, St. Croix, St. Pierre, Sahara, Senegal, Senegambia, Somali, Somali (Italian), Straits Settlements, Tonquin, Tripoli, Tunis (French), Tunis (Italian), Timor Islands, Uruguay 1862, Ukrania, Venezuela, Virgin Islands, W. Africa (French), (182).

[6] *Use of the U. S. American Liquid Measures Illegal in Canadian Trade.*

Consul Johnson, at Kingston, Canada, reports:

"A ruling by the Canadian inland revenue authorities in regard to liquid measures should be carefully noted

interfered with their *co-ordination and efficiency* promptly to aid their allies.

The French Minister of War, Millerand, said Kitchener's volunteers promptly arrived in France, splendid battalions, but *unarmed*. The German kaiser counted upon this confusion of standards for 2 years' delay—he thought he could crush France and gain world power before the allies, thus handicapped, were ready—indeed in ½ the time.

The world war brought forth an eloquent fact: Both Britannia and U. S. America were forced to adopt the metric standards for use abroad.[6] This they did promptly.

by American manufacturers, merchants, producers, growers, packers.

"U. S. American gallon is approximately 20 per cent smaller than the Canadian gallon, more exactly, the gallon in use in Canada is equal to 1.2009 U. S. American gallons.

"Many complaints have been made in Canada as to the sale of goods put up by Americans according to the U. S. American unit. American goods measured by the smaller unit have an unfair advantage over similar Canadian goods." (It works injury both ways: During the war a San Francisco concern received an Australian cable asking it to offer 1,000,000 gallons of oil for immediate shipment. Bargain was closed by cable, oil shipped—then came Australian cable saying, "Of course you sold us Australian gallons." Yanks shipped 200,000 gallons more oil without charge, making them 15% loss instead of 3% or 4% gain and 1% expense. They are working for meter-liter-gram now.)

"WINE MEASURE SALES ILLEGAL. All concerned are, therefore, advised that the sale of anything in Canada *by wine measure is illegal*; that the offering for sale of any goods of which the contents *are clearly marked in some unit of U. S. American measure*, e. g., '1 pint U. S. American standard' *is illegal*, that representing unmarked containers of goods as pints, quarts, so on, when their contents are actually United States measure (wine measure) *is illegal*. Canada runs on British beer measure exclusively.

"WEIGHTS AND MEASURES ACT. The Weights and Measures Act of Canada prescribed the use of certain Canadian weights and measures, *or the metric system, in all dealings in Canada*. Fines are provided for selling goods according to any standard other than those stated above."

"The large French population of Canada has greatly increased the use of the metric system there. The fact that the *metric* weights and measures are legal in Canada, *as in all other parts of the world*, while the old United States measures of capacity *are not even legal* in Canada is only another reason for quoting world trade on the *metric* basis and coming to use of the metric units as soon as possible."

[6] General Order number 1 of the United States of America War department, issued on 2 January, 1918, states: "The metric system has been adopted for use in France

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President F. O. Wells of the Greenfield (Mass., U.S. America) art cap die gage hole jig jag nib nub rim ream slot slip slit slide snip screw tab tip top test terse tie tread trim tug tube zig zag machine tool co., the concern that manufactured so many things indispensable to the supply of war munitions, declared (and hosts of other experts agree with him) that the German kaiser would not have dared declare war if America and Britannia had been standardized on metrics when the Germans adopted the system exclusively in 1871. In that event they could instantly have co-operated with one another and with all their allies, co-ordinating the supplies and munitions from every part of the world.

The history of meter-liter-gram emphasizes the advantages gained by those nations that use it. No other period of history emphasizes this more than the era of the world war.

Since the metric system bestows such manifest benefits, why do not *all* use exclusively this simple and convenient tool? A few opponents put forward a variety of answers, of no effect.

Obstruction: While the metric system was legalized in America 1866, its exclusive use has been delayed by 3 factors: (1) the confusion occasioned by its Latin and Greek prefixes; (2) habit, custom; (3) ignorance of the value of uniformity.

As to the first cause of delay in adoption: Sometimes the popularity of an invaluable necessity is long deferred by its name. The metric system is the victim of terms—not the name "metric" perhaps, although even that may seem formidable. But the Latin and Greek prefixes confuse the mind, and obscure the Watt simplicity of the system, so as to delay its adoption in English-speaking countries.

This objection, however, can be disposed of as inconsequent. America does not use these terms—that is, not exactly—in the metric decimal money system, the unit of which is the dollar.

That is all that is necessary for 90 per cent of the people to know—dollar-meter-liter-gram. All these units may be multiplied and divided just like dollar.

Not very difficult, is it?

for all firing data for artillery and machine guns, in the preparation of operation orders and in map construction." Ordnance such as the 75 and 155 milli-meter guns have been adopted by the United States Army and are successfully made in America.

The 2d cause of delay originates from our habit of thinking in obsolete yards, feet, hands, spans, inches, fathoms, rods, links, chains, furlongs, miles, pounds, 2 different quarters, quarterns, ounces, pennyweights, minims, drams, grains, scruples, dwts., 3 different cwts., 2 different tons and 1 tun, 4 different stones, 4 different pounds, 4 different ounces, 2 different gallons, 2 different quarts, 2 different pints, gills, many different bushels, many pecks, and so on. Also we think with different units for different objects. Dry measure, wet measure, wine measure, beer measure,[8] avoirdupois, apothecary, troy weight and so on *ad infinitum*. Just think of the innumerable different units to which we have accustomed ourselves, mostly German, which Germany scrapt in 1871, and put in her museums beside stone axes, stone adzes and other stone age tools.

Instead of such a horrible hodge-podge (it is no system, no science), making change undesirable, it is itself really the best reason for simplification and the universal application of meter-liter-gram. What we must do is to cast aside the shackles of ages-long custom and habit, now binding us in an ugly sort of mental slavery.

As to the 3rd cause of obstruction; until 1914 Germany, Austria, Hungary, Bulgaria, Turkey had not succeeded in convincing Britannia-America of the indispensable necessity of being united, always ready, equipt with the best up to the minute, for World War and World Trade—now they are convinced.

It may be feared by some that the expense of changing from the present confusion to the simple scientific decimal metric standards would be prohibitive. But it did *not* prove so in the case of all the other 152 countries of the world (including Germany, Austria-Hungary, Bulgaria and Turkey) that have adopted it.

Contrary to the generally prevailing idea, weights will *not* have to be replaced—merely readjusted, and scale beams re-marked. The measures on hand can be adjusted or used for containers. The difficulties of making the change are largely imaginary, as has been proved by all the 152 countries that have already done so. *All* are glad they changed and they wonder why in the

[8] See note [4], page 6.

name of science and good business the 2 laggers have not followed or did not lead.

America-Britannia are bearing an enormous wholly unnecessary load because of the selfishness and the lack of patriotism of a very small percentage of the whole people. Surely not more than 10% object, they not having looked it up.

Cannot the American-British people do what Germans did 1871—put meter-liter-gram into exclusive use?

How it was done in Germany. In Germany, Austria, and the other lands of the hun, the change was made in the cities in a few weeks, in the country in a few months. Manufacturers went on just as they were, using tools they had—no machines, tools or drawings were scrapt—plenty of witnesses living.

Those of our manufacturers who have adopted meter-liter-gram have found the saving to be so great that the cost of the change was quickly made up. Kynoch, the Krupp of the British Isles, adopted the metric system in 1914, and its President, Chamberlain, declared that it paid for itself in 1 year at a cost of only 1 per cent of a year's dividends.[7]

The Wells concern adopted metrics in 1914 and saved annually for itself $50,000.00 as well as benefitting its customers annually $50,000.00. Many other producers, merchants, manufacturers in U. S. America-Britannia now make exclusive use of the metric system or of 2 standards.

Panama, Filipines, Porto Rico, Cuba — parts of U. S. America — have long used meter-liter-gram, and other Americans going to and working in these parts find they gain proficiency in the use of meter-liter-gram in about 2 weeks without effort, and wonder why the rest of U. S. America continues to muddle along with a German jumble that even the Germans scrapt in 1871.

So much for the objections. All difficulties, real or imaginary, fade into insignificance when compared with the tremendous savings and gains attainable. There are almost inconceivable wastes avoided, alike in war and peace, in world trade, in domestic business, in teaching, in trying to learn. So many phases of human activity and endeavor assume a new, a more simple, a more automatic, a more scientific logical meaning and

[7]The Herald, New York and Paris, in a metric campaign (1900) published columns of interviews with leaders in World Trade. Thousands advocated meter-liter-gram.

use when we utilize the greatest invention of humankind, the Hindu science of positional decimal arithmetic, and its numerals, 1234567890, in *combination* with weights, measures, money—what James Watt thought his greatest work, that became the metric system.

Scrap the obsolete. Let us and the world no longer be compelled to transfer, translate, transcribe the obsolete into and out of meter-liter-gram! All we have to do is to *think* meters and fractions, liters and fractions, grams and fractions, dollars and fractions—that is to say, dollars and cents.

Simple, is it not?

In the science of positional decimal arithmetic, constantly thinking, working in percentages develops *perspicacity*, a sense of the proper proportion of things which is of great national value in peace and war. It will eliminate 90% of the time and effort spent on vulgar fractions.[8] There will be no tables to learn or study of weights, measure, coinage. Dollar-meter-liter-gram will take the place of practically all.

Educators urge its adoption. The committee recently appointed by the British Prime Minister to inquire into the position of natural science in the educational system of the British Isles (Cd. 9011) reported:—"That the present chaos of British weights, measures, coins causes great waste of time and confusion of thought which are strong educational reasons for the adoption of the metric system." The same is equally true of N. America, Australia, New Zealand, United South Africa and so on.

Clyde Wolfe, Master Mathematician, University of California, writes:

"A conservative estimate is that the exclusive use of meter-liter-gram would shorten the time of teaching arithmetic to the average child by 2 years."

Practical application. Is there one person in 10,000 in America or Britannia who can define accurately all of th old obsolete German-British weights and measures scrapt by Germany in 1871, but with which we are still handicapped, legicapped? Gladstone said there was not one. But when meter-liter-gram come into practical

[8]Galsworthy and the upper 1% of England write, 9/10, 9/10, 9/11, 3 11/27, 1/11, 3 17/20, 14 £ 12 s 6 d; the upper 75% of America writes .22, .75, .55, 3.27, .009; 3.68, $73.52.

1434

world-wide use, every one in the 10,000 will as readily compute in meters-liters-grams, as they do now in dollars, or any decimal metric money.

Consider the business facilities implied by uniform standardization *everywhere* in use; consider the simplification of sizes of *every commodity*. In this airplane age, where the pilot may cover 1,000 miles in a few hours, uniformity of standards in measures is indispensable. (The airplane alone started a new era, which is emphasized by the helium fire-proof zeppelins, one of the greatest achievements of science during the World War.[9]) Consider the ease, economy, and accuracy of registering, calculating,[10] computing, recording, tabulating, invoicing, quoting and cataloging to the world that reads American-British publications, and of educating the 570 millions of Britannia and U. S. America. The people of every language will use the same system in peace, or will be ready to aid all allies instantly in war. It would add a year or more to the life of each of these 570 million humans of Britannia and U. S. America, and the other 1,000 million humans will benefit enormously.

Should meter-liter-gram not be put into use as was railway standard time, the world postal union, the Marconi world-wide code, the world-wide telegraph union, the daylight-saving plan, world airplane road rules for air navigation? As a war or peace measure, it will be a comparatively small undertaking. Can we afford to be unprepared for world trade, and always possible war, even inciting war by this unpreparedness? Safety first! Stop, look, listen!

U. S. American Congress and British Parliament can put it into use for America, Britannia, all allies and the world, in an hour.

In a financial editorial of the San Francisco Bulletin, John H. Gerrie, a world-traveled trade expert, strongly urges:

"Why not *try* the exclusive use of the metric units in U. S. America? This is recommended in a resolution adopted by the U. S. American

[9] Germans sent 25 million grams of medicine and munitions by zeppelin to German East Africa. They found Britannia's flag flying, so without alighting zep brought home the 25,000,000 grams freight, crew and hotel. Now British Americans have made zeps fire-proof, surely marking a new epoch.—*Literary Digest*, 22 February, '19, page 27.—*Adv. Review of Reviews*, Mich., '19, p. 322.

[10] Means calculator adds, multiplies, divides, subtracts, with the speed of light and satanic accuracy.

section of the International High Commission, of which Secretary McAdoo is chairman. This would seem the logical time for its adoption into world-wide use. It is in use in every civilized nation, excepting only U. S. America and Britannia. Its exclusive use would greatly facilitate world commercial relations. President Wilson and Premier Lloyd George can promulgate it in 10 minutes for America and Britannia to the benefit of all humankind." Try it; then go back to chaos if you wish—look it up.

Honorable William C. Redfield, U. S. American Secretary of Commerce, addressing the Philadelphia Chamber of Commerce on 10 January, 1917, said: "The fact, of course, is that the metric system, adopted exclusively by 34 nations is simpler, easier, more effective, and more widely used than any other. It has made its way by its merits. There is no argument for the retention of our present weights and measures that is not an argument against our decimal metric dollar system. No reason supports our decimal dollar system of currency that does not support decimal system of measure. *This handicap we must throw off*, get out of the darkness—out of foolishness toward reason."

Speaking at the annual meeting of the American Association for the Advancement of Science, 27 December, 1918, Mr. Redfield voiced the conviction that meter-liter-gram should and would be adopted soon by U. S. America. A list of endorsers' names, the best in the world, would fill books.

The American National Association of Manufacturers, by its founder and president, Theodore C. Search, advocating meter-liter-gram legislation before Congress, 1904, says (Science v. 15, p. 434): "Whenever manufacturers undertake to extend trade outside U. S. America-Britannia they encounter meter-liter-gram, the only uniform measure through all the world." Had Congress done it then war would have been shortened 2 years if it had been caused at all.

As Andrew Carnegie says: "Our weights and measures are a discredit to us. We shall inevitably adopt meter-liter-gram, if for no other reason than as an aid to peace; but it would enormously aid our world trade."

David Starr Jordan wires: "Weights, measures,

PART OF PLAINTIFF'S EXHIBIT 25 A.

coinage serve convenience; meter-liter-gram incomparably most convenient."

The World Trade Museums, Philadelphia, organized a Pan-American party, one delegate each, from 100 cities of South America, Central America and Mexico Chambers of Commerce, and escorted the party to all North American cities. This party said unanimously: "We use only meter-liter-gram. We can't understand why you use what you do. We won't bother with it; it's ridiculous. British and Americans lose trade, are handicapped and hampered by stone age German scrapt tools—measures. Get meter-liter-gram."

American associated steel makers urged Congress (H. R. 7251) to secure metric units. (Sci. Am. Sup. 24 Feb., 1900.)

After the world war, whatever else may be, the world will be a smaller place. Whatever methods may add to better understanding and better business and better safety from German attack, this is surely the best of all. *Why not try it?* Foch has made 10,000 winning decisions for all allies, why not let Foch decide this? As ½ of this sort of thing has been done by proclamatjon or orders in council, why not Wilson and George proclaim *meter-liter-gram?*

"*Our* customers are always right"—"everybody is good to us"—"none are foreigners, all are friends"—"we love our enemies"—we find they do us as much profit as friends. We do good to those who despitefully use us. So we willingly consent that our Governments grant licenses to those who prove to proper authorities that exclusive use of meter-liter-gram really injures them—to be licensed to use the old German jumble till they are dead—awake! look it up and see. The model Swiss republic licensed watchmakers, who soon found when they looked it up—watched out—that they were letting go by valuable advantages—so they voluntarily used meter-liter-gram. Used it ever after—ask them—they're glad. You could not get them now to touch the German jumble. Swiss motors, engines, machines, run and work like Patek Fille Swiss watches.

That the English-speaking world may secure the benefits of meter-liter-gram with the conclusion of peace will you not *act together and co-operate* with us, using your individual or corporate influence by writing, now, to legislators of America and Britannia that you endorse the adoption

of meter-liter-gram? Use the coupons provided for the purpose on page 16 of this letter, if you prefer. Or, if an organization, have the proposal endorsed by your body and forward the endorsement to legislators of Britannia and America. Stamped, address envelopes (2) are enclosed.

"One weight, one measure, and one coin, will soon the warring world in friendship join!"—and keep the world war won.

Anyone, anywhere, who in any way can, will, or wishes to aid this good cause to benefit all humankind, please communicate with

WORLD TRADE CLUB,

681 Market St., 3, 4, 5, San Francisco, U. S. America.

World Metric Literature: James Watt, 1783, Life of Watt by Andrew Carnegie. The team of Wonder Workers, Benjamin Franklin, Joseph Priestly, Talleyrand, George Washington, Alexander Hamilton, Thomas Jefferson, Governor Robert Morris, 1786, James Madison, John Adams, John Quincy Adams, Charles Sumner, 1866, Barnard of Columbia on Metrics, 1872, Melville Dewey, University of State of New York, American National Association of Manufacturers, Carnegie Committee's report 1898. World Weights and Measures Bureau, Paris, Chambers of Commerce of Britannia and America Convention reports. British-American and 55 other legislative committees commissions reports Encyclopedias Americana, published by Scientific American, New York, article by S. W. Stratton, Director U. S. Bureau of Standards, Dodd-Mead, Century, Annual New York World, Britannica, Halleck Wade, N. Y. Book, 1906. Martins Tables, London, 1907, Foster's Coming of the Gram, Booklets of 3 Decimal Associations. Finsbury Pavement House, 212 London, 35 Market St., Manchester, 156 Fifth Ave., New York. Crane's Valve World, Chicago, World Trade Club, San Francisco, U. S. America, v. 15 Science, Popular Science Monthly, Electrical Review (London) 17 January, 1919. See communications urging, requesting, demanding legislation that will bring about the exclusive use of meter-liter-gram in and between Canada, British America, Australia, New Zealand, India, Egypt, British Isles, Ceylon. If not already done there is insistent demand in U. S. Africa. For bibliography, weight and measure, 1790 to 1890, see U. S. America congressional serial number 2953 pp. 371-376. U. S. Treasury Department, Geodetic Survey. For chaos 27 February, 1835, see Select Committee of Philadelphia business men on weights and measures. Report to Congress advocating remedial legislation for uniformity—John Adams, Secretary State. Thousands of metric articles may be found in library indexes of quarterly, monthly, weekly, daily, literature of America and Britannia. We now index Red+United War Workers, Y. Human, C. A., Organized Women, the Federated Workers, Warriors, Washington, London, Paris, Rome, Pretoria, Simla, Tokyo, Sydney, Toronto. Warriors and Workers Metric Manual—U. S. Am. Govt.

1133

PART OF PLAINTIFF'S EXHIBIT 25 A.

British Premier,

His Excellency DAVID LLOYD GEORGE,

Houses of Parliament and Committees or Commissions
on Weights, Measures & Coinage

London,

1134 British Isles

U. S. American President

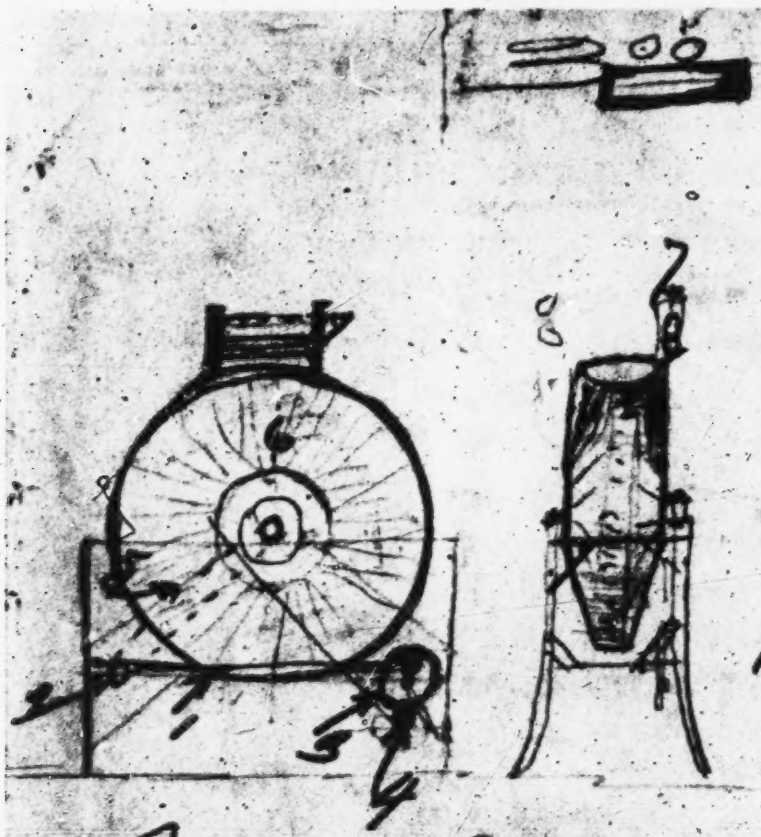
His Excellency WOODROW WILSON,

U. S. American Congress and Congressional Committees
on Weights, Measures & Coinage

Washington, D. C.

1135 U. S. America

PLAINTIFF'S EXHIBIT 25 B.



1 = Rack bar
2 = Pinion
3 = Crank wheel
4 Motor
5 Chain
6 Fat.
7 Wringer

Howard Snyder
Dec. 13, 1918

1130

U. S. D. C. W. D. Mo. W. D.

THE MAYTAG COMPANY

vs.

GENERAL ELECTRIC SUPPLY CORPORATION

IN EQUITY 2892

DEFENDANTS EXHIBIT 25B

PLAINTIFF'S EXHIBIT 25C.
769

U. S. D. C. W. D. Mo. W. D.

THE MAYTAG COMPANY

vs.

GENERAL ELECTRIC SUPPLY CORPORATION

IN EQUITY 2892

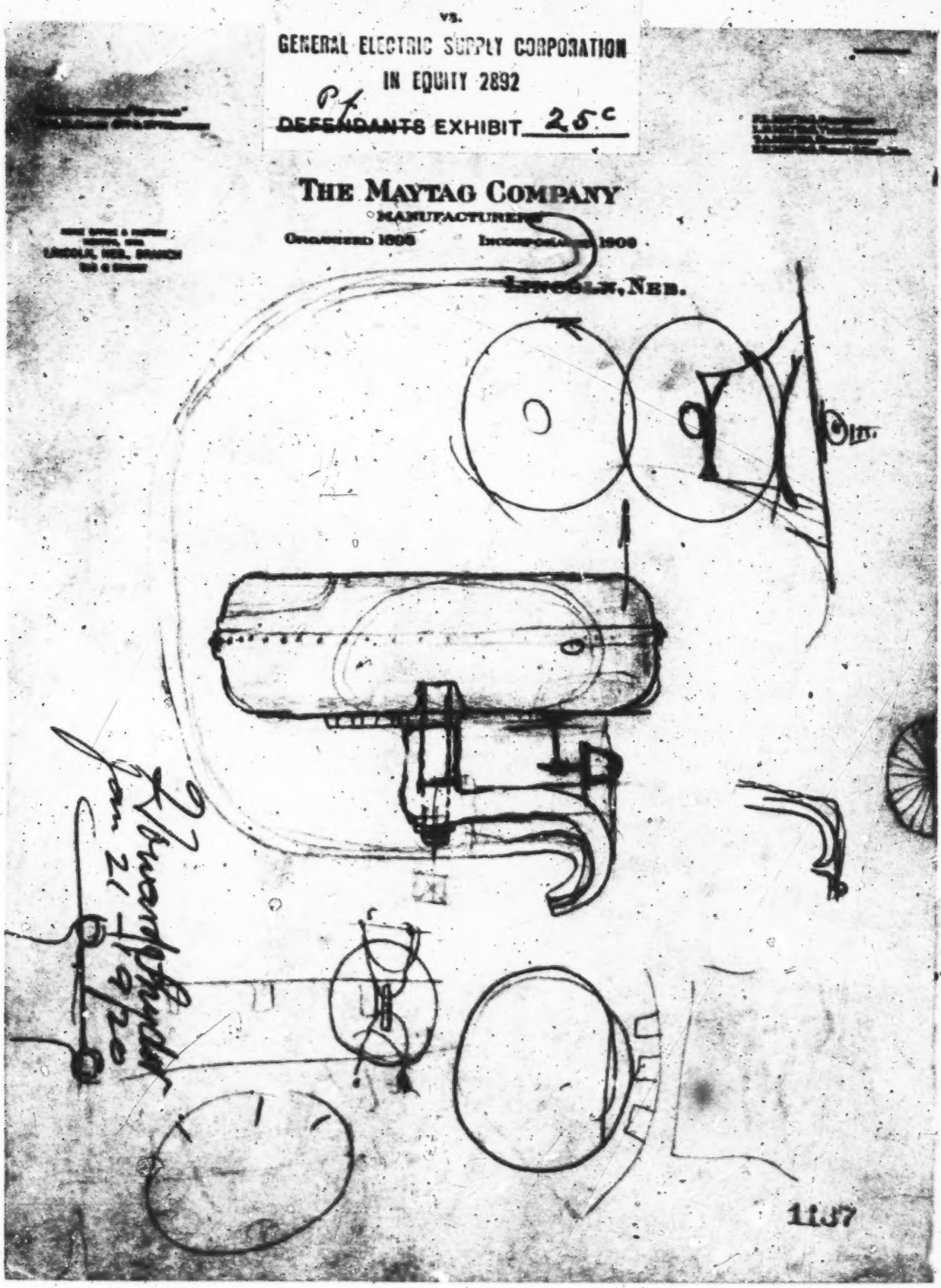
DEFENDANTS EXHIBIT 25C

THE MAYTAG COMPANY

MANUFACTURERS

ORGANIZED 1895 INCORPORATED 1909

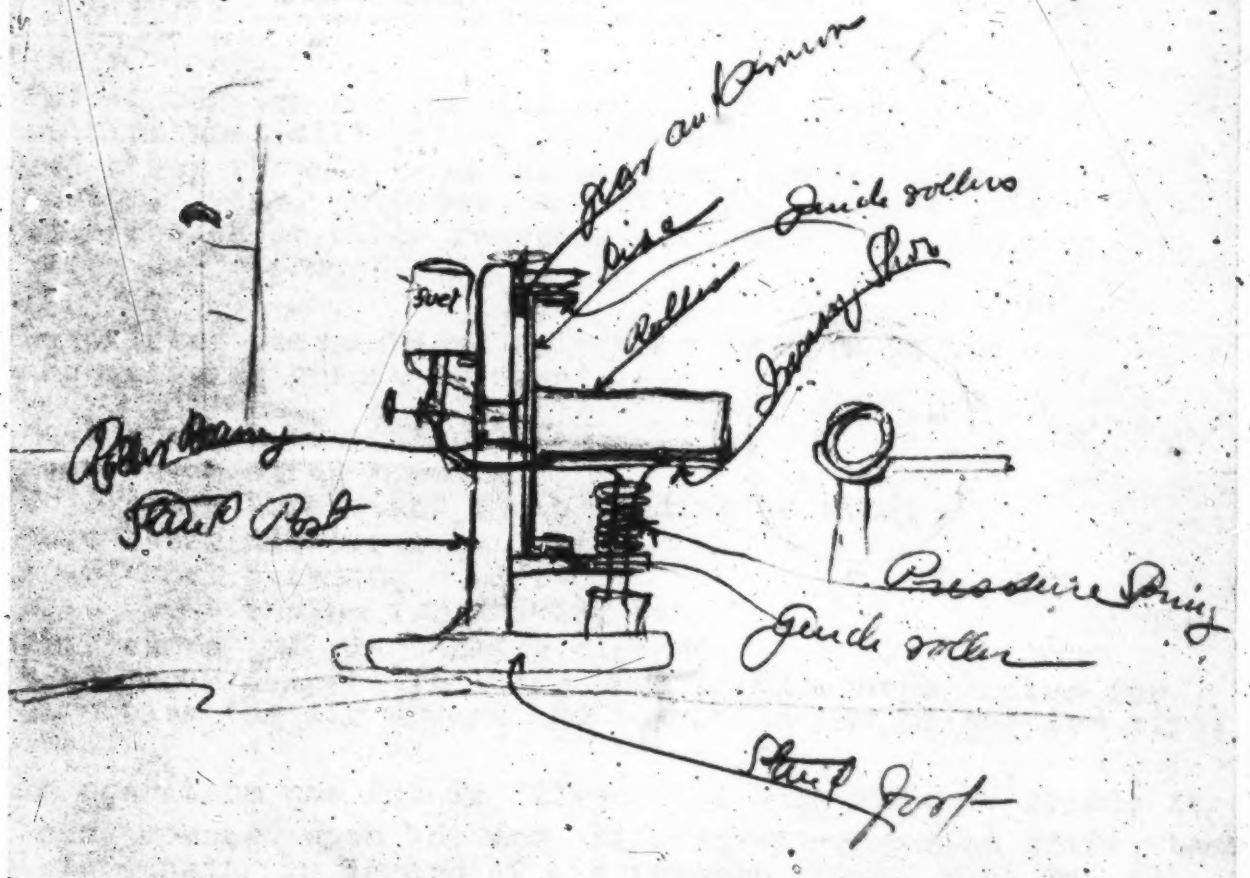
LINCOLN, NEB.



1137

PLAINTIFF'S EXHIBIT 25 D.

Howard Hayden
Sept 26 – 1920



U. S. D. C. W. D. Mo. W. D.

THE MAYTAG COMPANY

vs.

GENERAL ELECTRIC SUPPLY CORPORATION

IN EQUITY 2892

Pltf EXHIBIT 25 D

1135

Pf & 25 E

PLAINTIFF'S EXHIBIT 25 E.

773

Maytag

THE MAYTAG COMPANY

NEWTON, IOWA

January 30, 1922

A

Insect Gatherer or Collector

This invention has for its object the provision of a machine that will gather the weevels, worms, bugs, and other rodents from the growing plants, such as cotton, beans, potatoes, and etc. and deposit them into a sack or other receptacle; from which they may later be destroyed.

Describing the machine, reference is made to the accompanying prints or drawings.

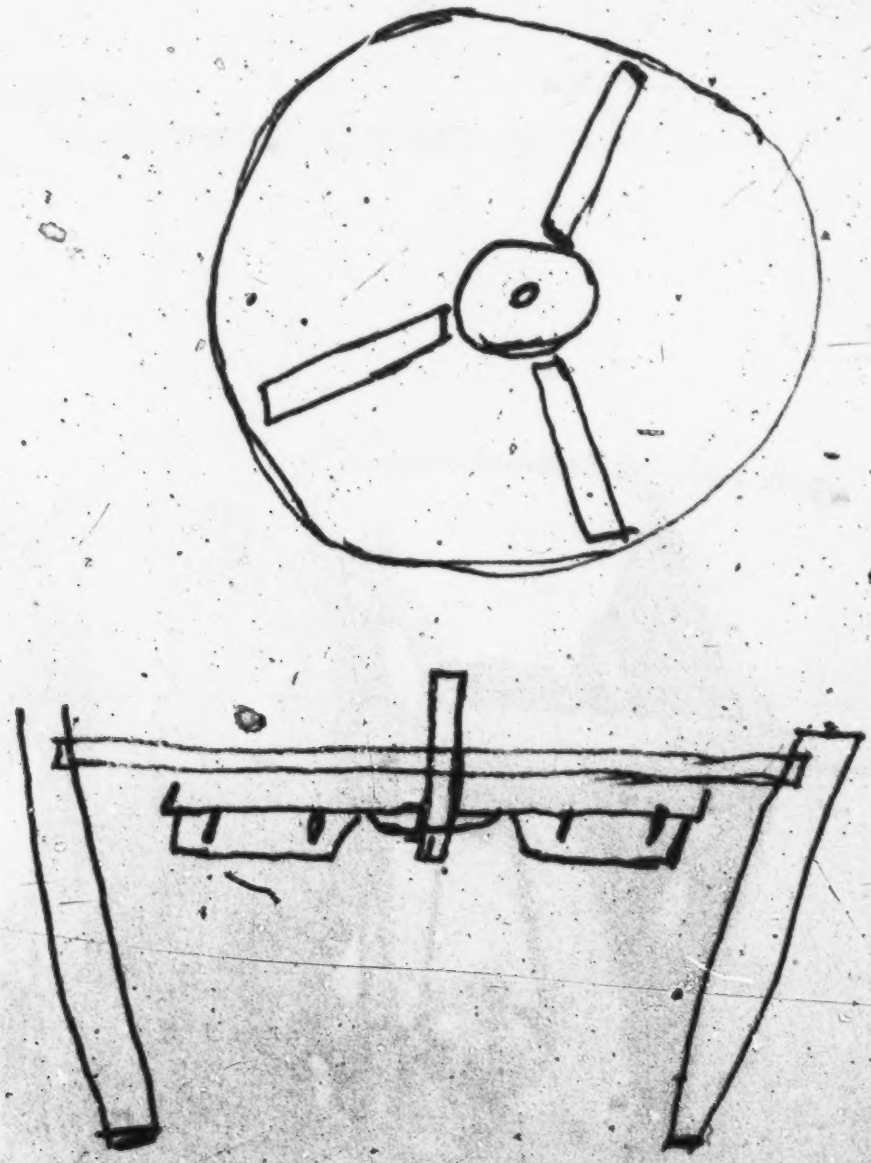
No.1 shows a centrifugal fan.
No.2 shows a fan housing.
No.3 shows intake and shute leading to same.
No.4 shows discharge outlets.
No.5 shows skimming outlet.
No.6 shows engine for driving fan.
No.7 shows the plant being cleaned.
No.8 shows dampers in lower ends of discharge shutes for directing the air upward and toward intake or suction pipe.

In operation the fan is driven at a high rate of speed; it being mounted upon the end of projecting engine shaft; ~~thus~~ this causing an inrush of air through intake (See No. 3) The air is then forced out through discharge openings (See No.4) and at this point the suction into intake pipe and outer discharge pipes work together to strip the plant of pests. These pests are shaken loose from the plant by a severe air blast and are carried upward into eyelet of fan with the inrush of air, and are centrifugally driven against outer casing of fan housing, and are thrown out with a small portion of air through opening, (See No. 5) and are there deposited in a sack or other receptacle.

Howard Snyder

773

PLAINTIFF'S EXHIBIT 26.



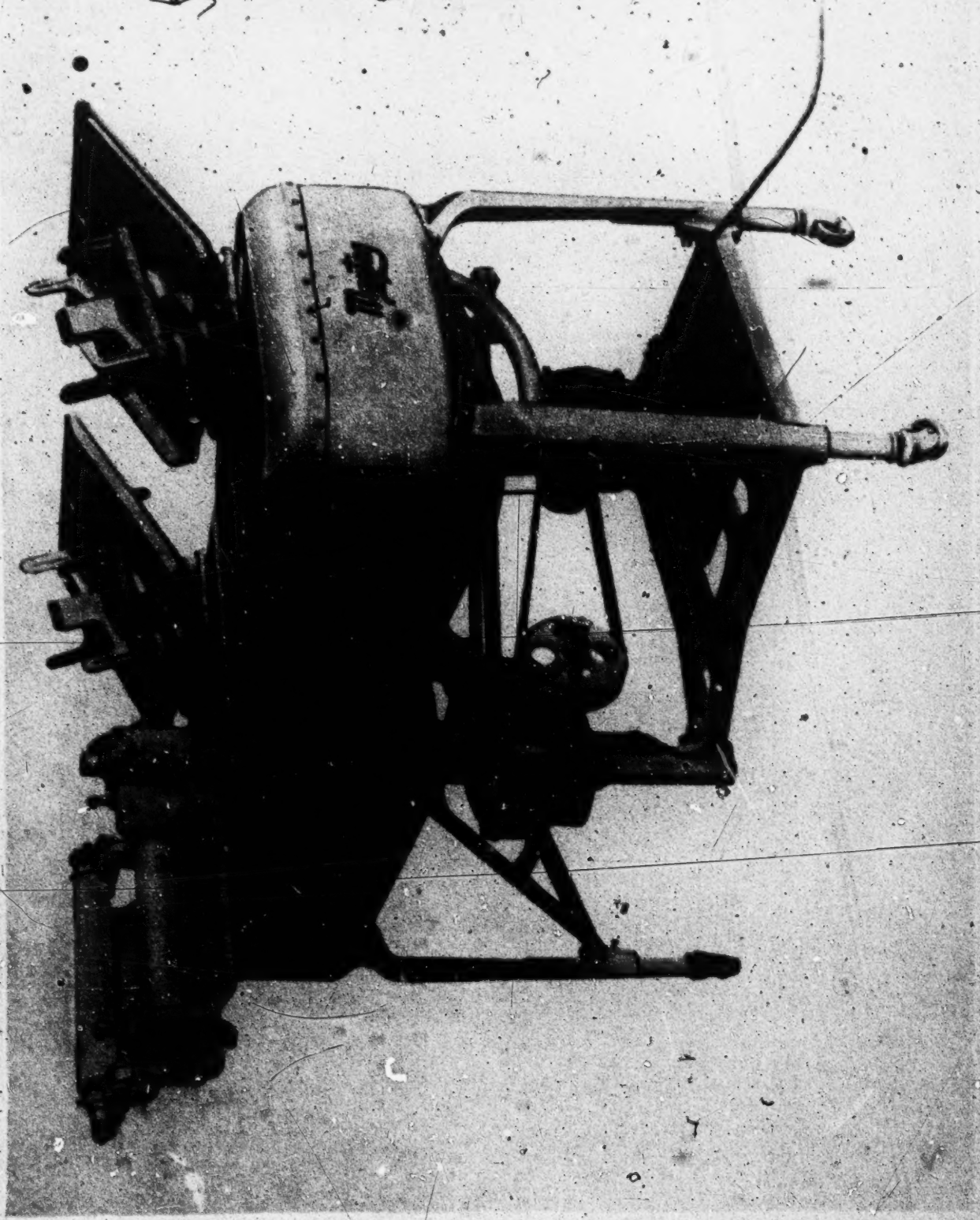
U. S. D. C.
THE MAYTAG COMPANY
vs.
GENERAL ELECTRIC SUPPLY CORPORATION
IN EQUITY 2002
DEFENDANTS EXHIBIT 26

E6822

United States District Court
Eastern District of New York
Exhibit 175 in evidence
Date 4/24/32
Clerk
Deputy Clerk

PLAINTIFF'S EXHIBIT 27-1.
777

Photostat of 27-1
PLAINTIFF'S EXHIBIT No. 27



1142 (Plaintiff's Exhibit 27-2.)

Plaintiff's Exhibit 27-2 was made a part of the transcript at this place, but same is omitted from the printed record, counsel having stipulated that it is a photograph, the subject matter of which is the same as that shown in Plaintiff's Exhibit 27-1, except that in Exhibit 27-2 the lids of the machine are closed.

1143 (Plaintiff's Exhibit 28.)

Plaintiff's Exhibit 28 contained Figures 1 and 2 of Snyder Patent, No. 1,391,214, and counsel have stipulated that it be omitted from the printed record for the reason that such drawings appear in Plaintiff's Exhibit 30 which is the Snyder Patent at page 799, infra, of this printed record.

1144 (Plaintiff's Exhibit 29, Letters Patent No. 1,417,306 to A. J. Dremel, May 23, 1922.)

780

A. J. DREMEL.

WASHING MACHINE.

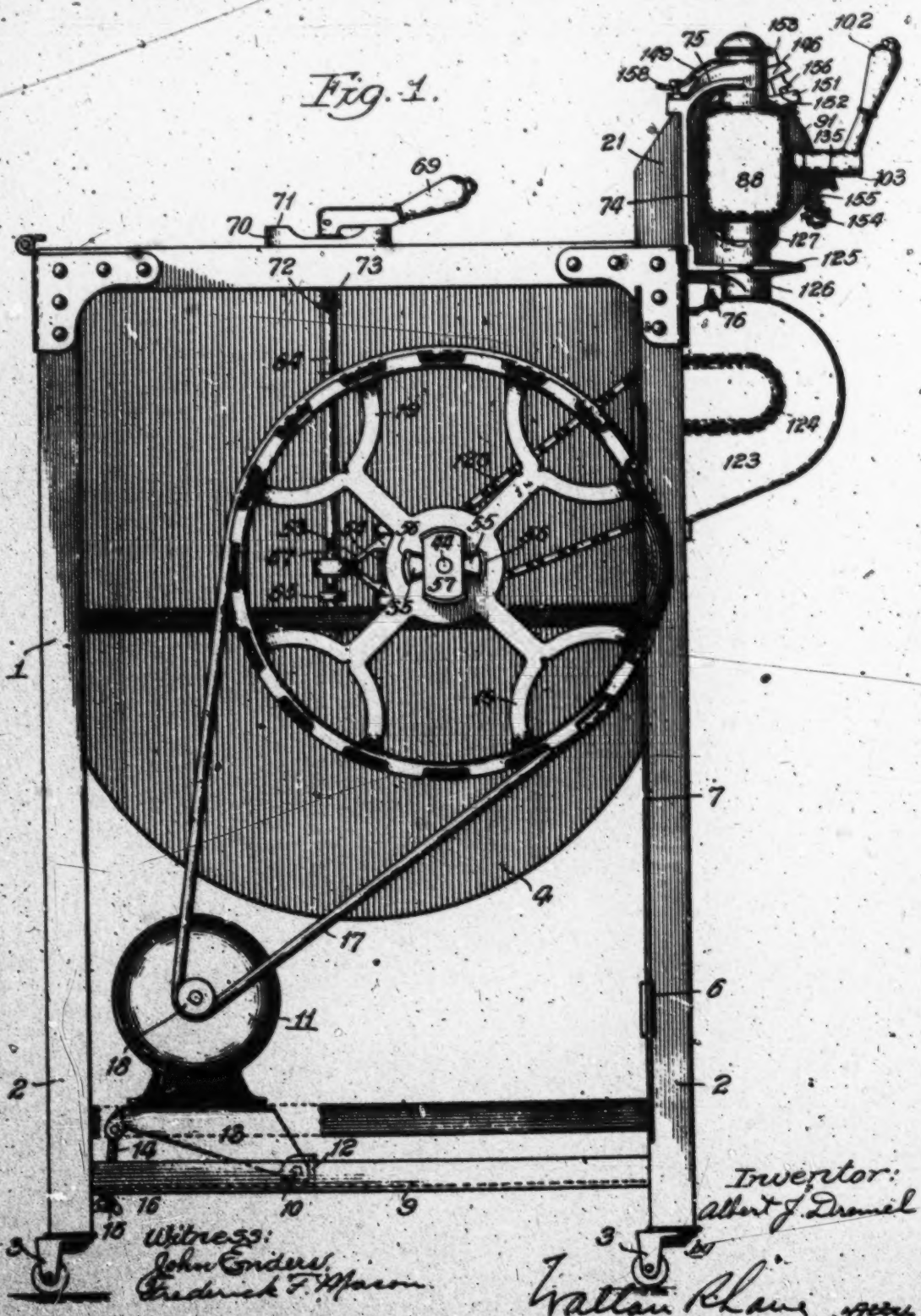
APPLICATION FILED FEB. 11, 1919.

1,417,306.

Patented May 23, 1922.

7 SHEETS—SHEET 1.

Fig. 1.



782

A. J. DREMEL.

WASHING MACHINE.

APPLICATION FILED FEB. 11, 1918.

1,417,306.

Patented May 23, 1922.

7 SHEETS—SHEET 2.

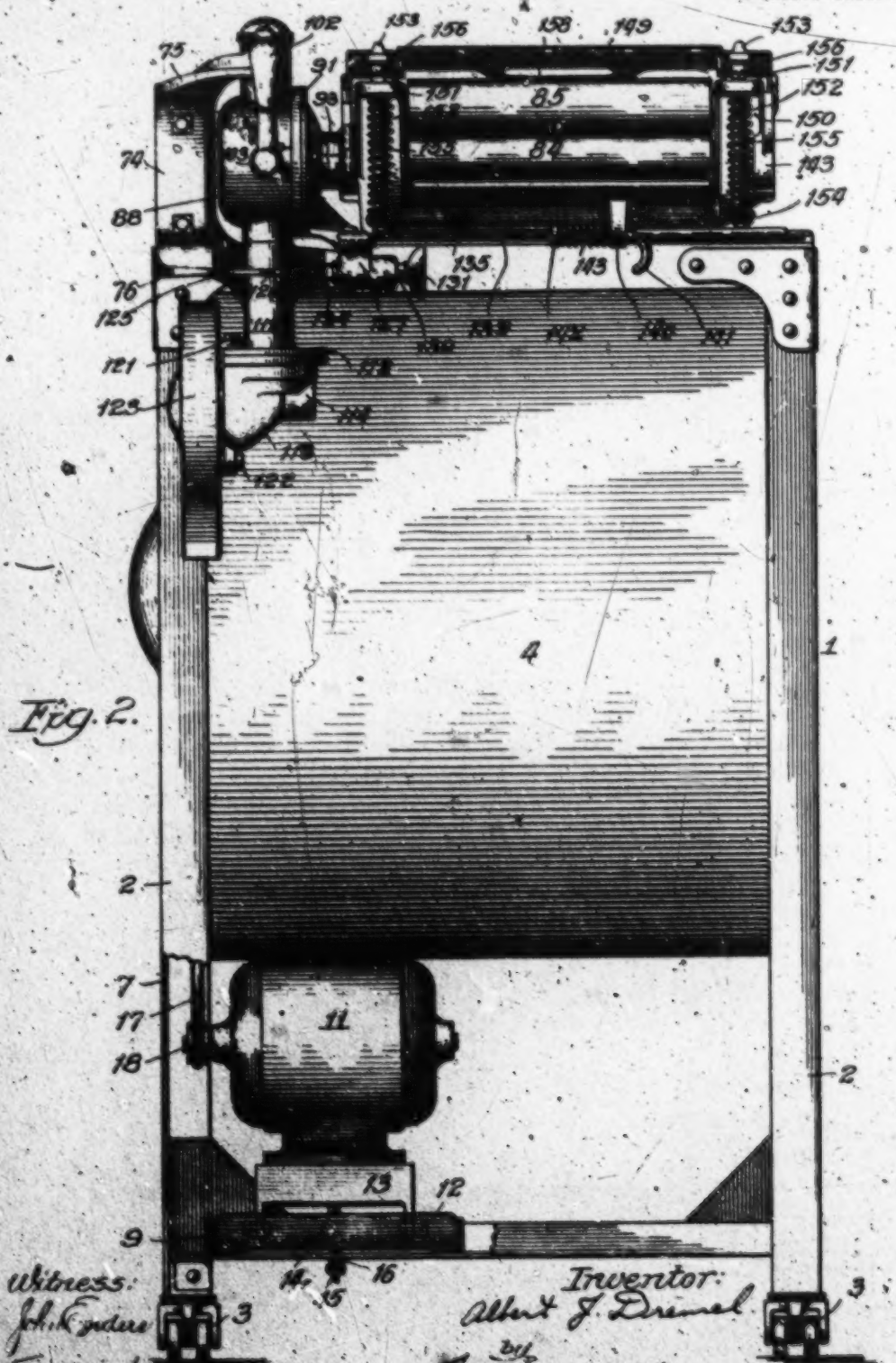


Fig. 2.

Witness:
John E. Endres
Frederick J. Wyman

Inventor:
Albert J. Dremel
by
Walter R. Lane
Atty.

784

A. J. DREMEL.

WASHING MACHINE.

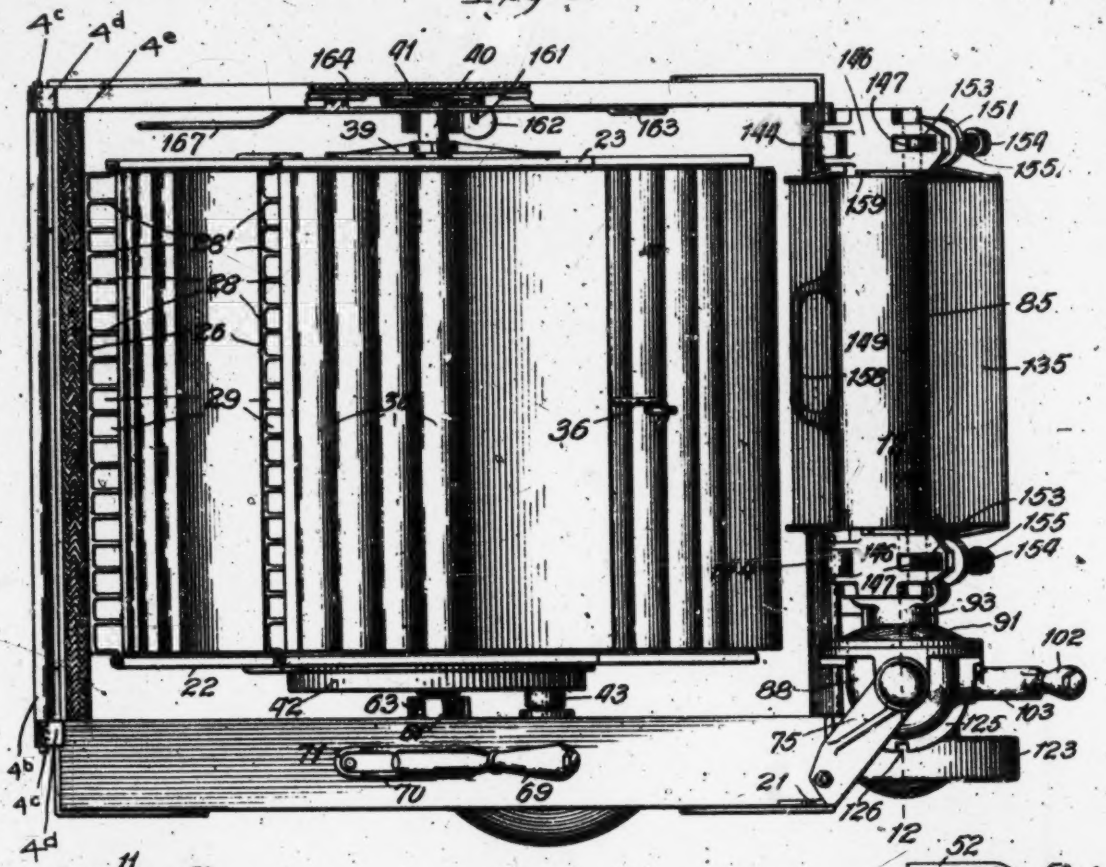
APPLICATION FILED FEB. 11, 1918.

1,417,306.

Patented May 23, 1922.

7 SHEETS-SHEET 3.

Fig. 3.



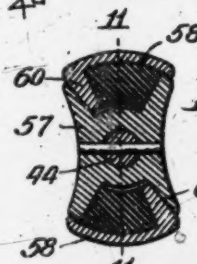


Fig. 10.

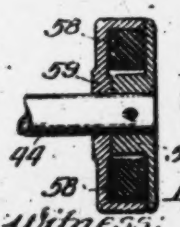
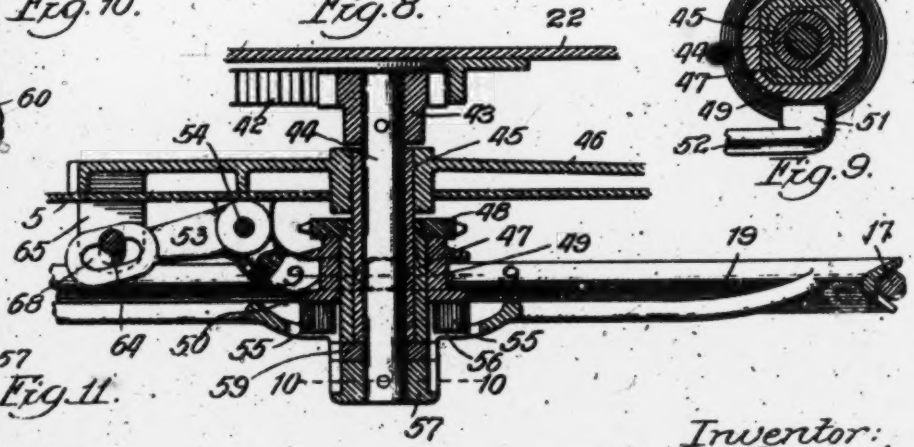


Fig. 11.

Fig. 8.



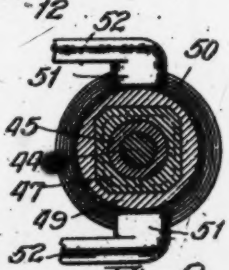


Fig. 9.

Witnesses:
John Anders
Frederick F. Mason

Inventor:
Albert J. Dremel
by
Wallace Clare
Atty.

786

A. J. DREMEL.

WASHING MACHINE.

APPLICATION FILED FEB. 11, 1918.

1,417,306.

Patented May 23, 1922.

7 SHEETS—SHEET 4.

Fig. 4.

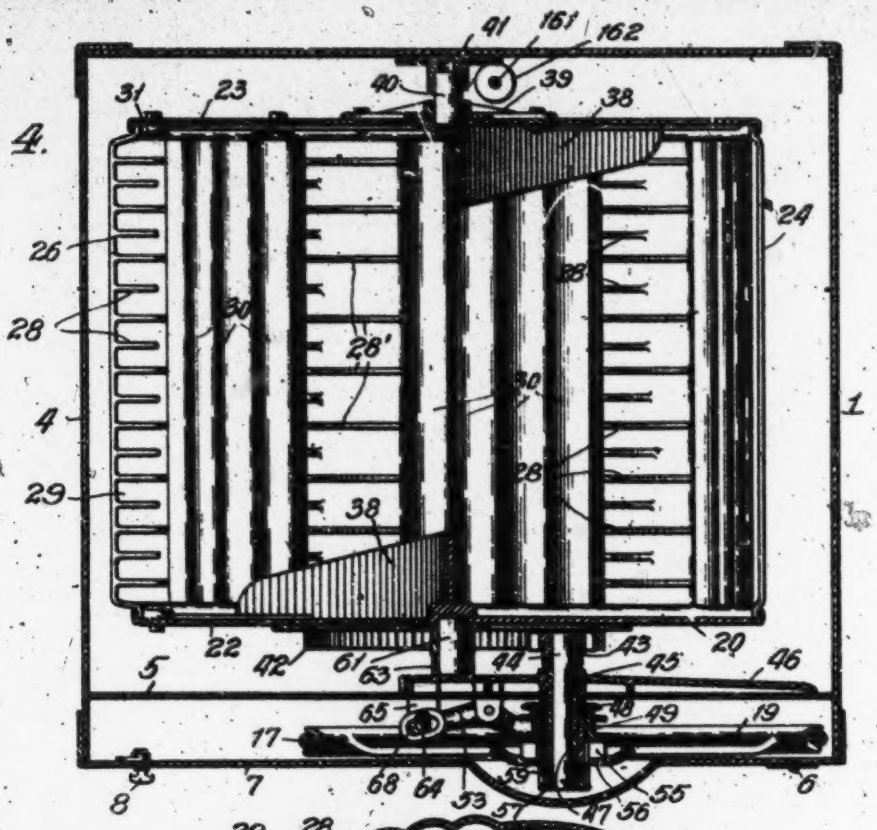
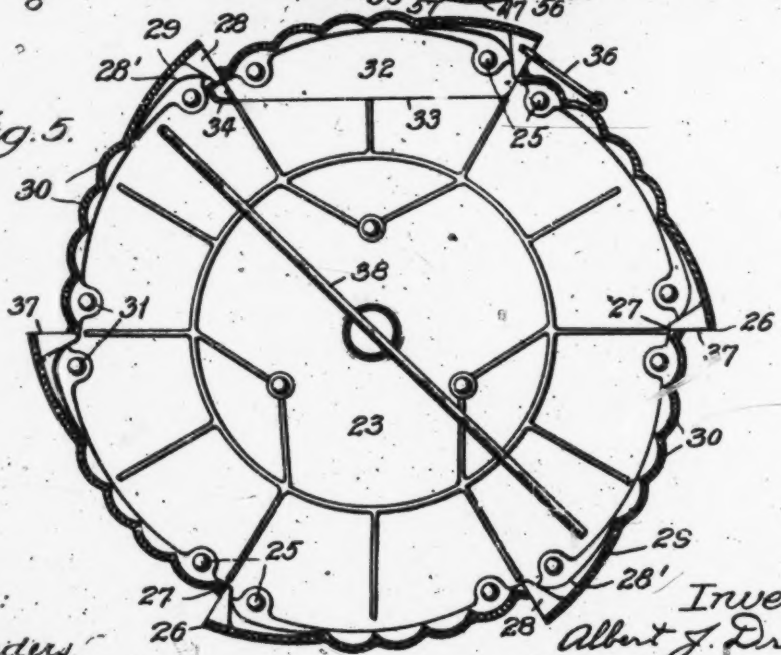


Fig. 5.



Witness:
John Enders
Frederick F. Mason

Inventor:
Albert J. Dremel.
by
Wallace R. Lane
Atty.

788

A. J. DREMEL.

WASHING MACHINE.

APPLICATION FILED FEB. 11, 1918.

1,417,306.

Patented May 23, 1922.

7 SHEETS—SHEET 5.

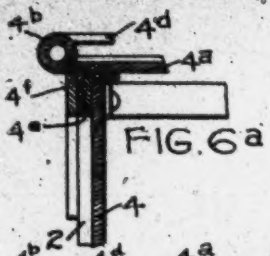
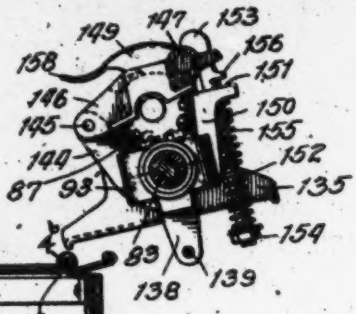


FIG. 6a

Fig. 6.



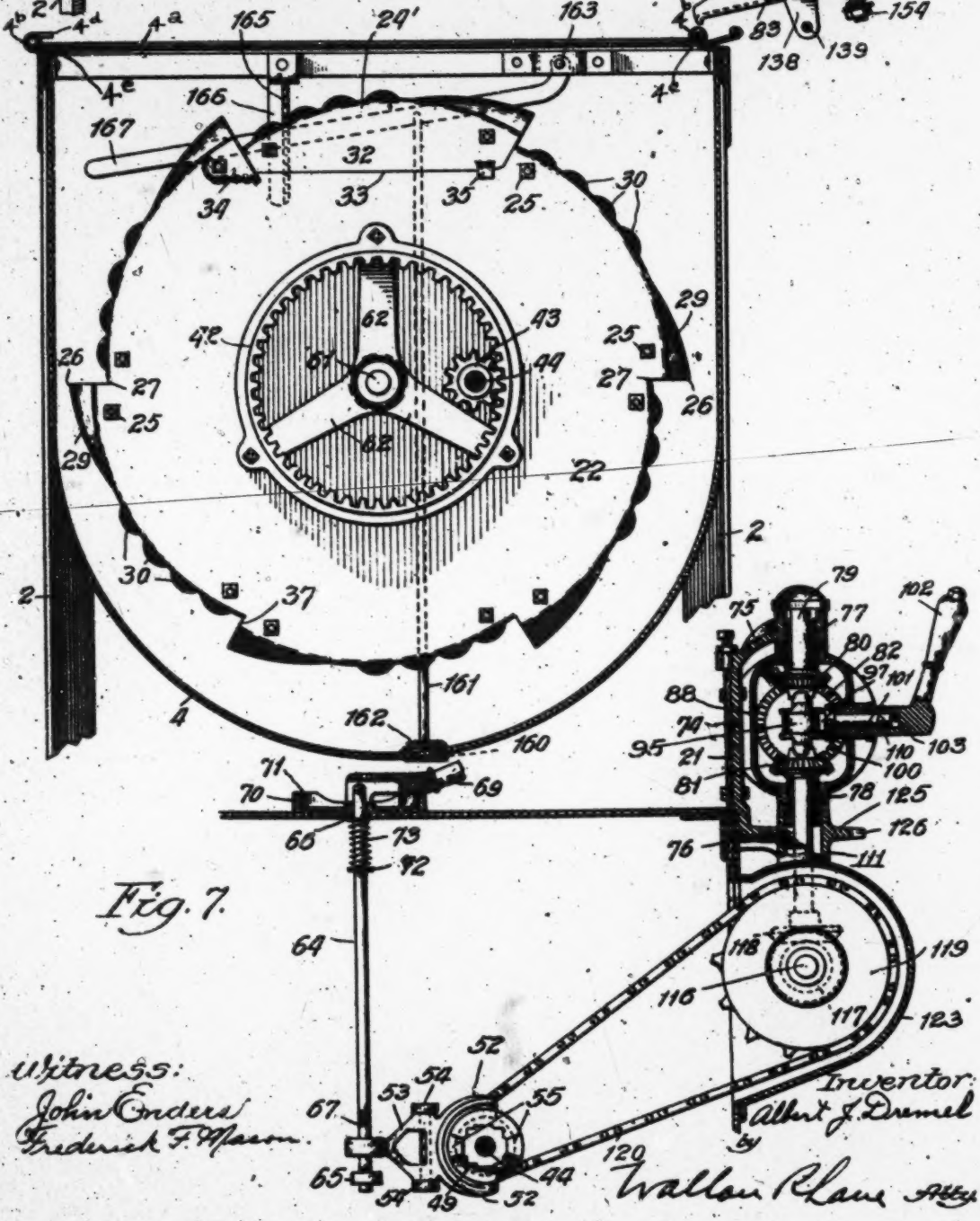


Fig. 7.

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790

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WASHING MACHINE.

APPLICATION FILED FEB. 11, 1918.

1,417,306.

Patented May 23, 1922.

7 SHEETS—SHEET 6.

Fig. 12.

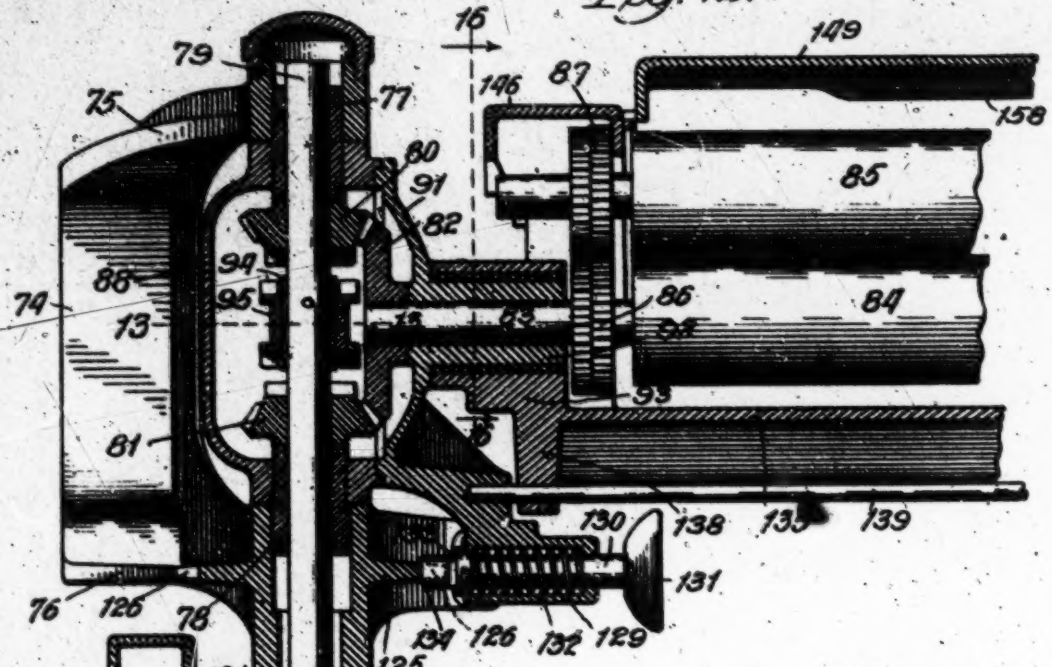


Fig. 13.

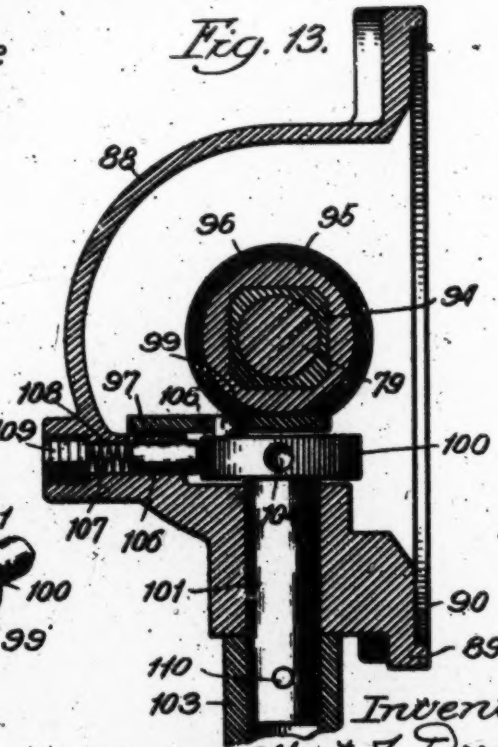
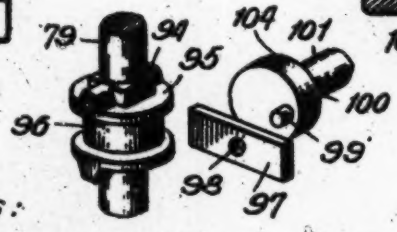


Fig. 14.



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APPLICATION FILED FEB. 11, 1918.

1,417,306.

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7 SHEETS—SHEET 7.

Fig. 15.

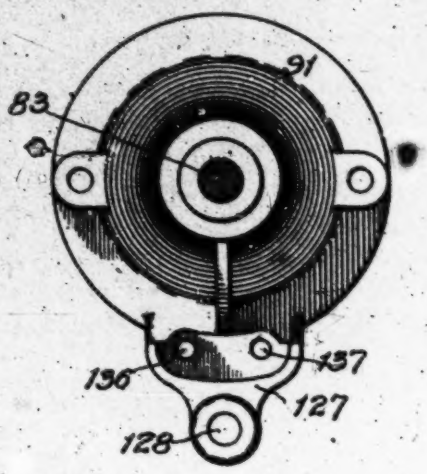


Fig. 16.

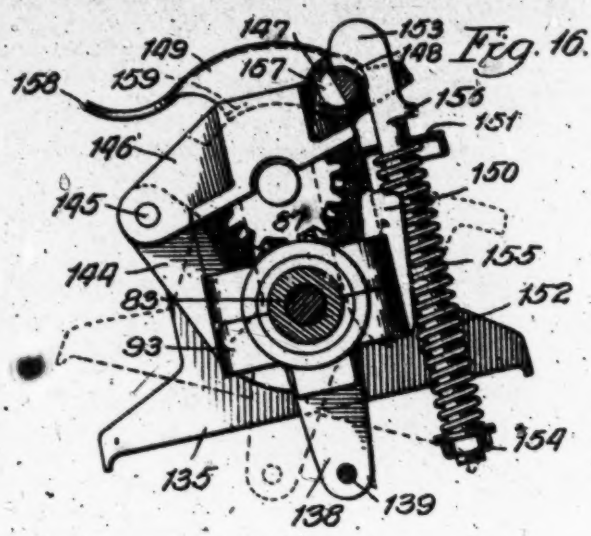


Fig. 17.

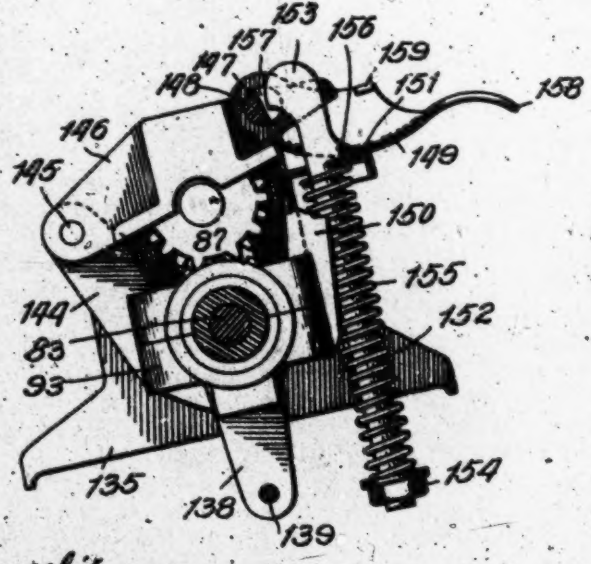
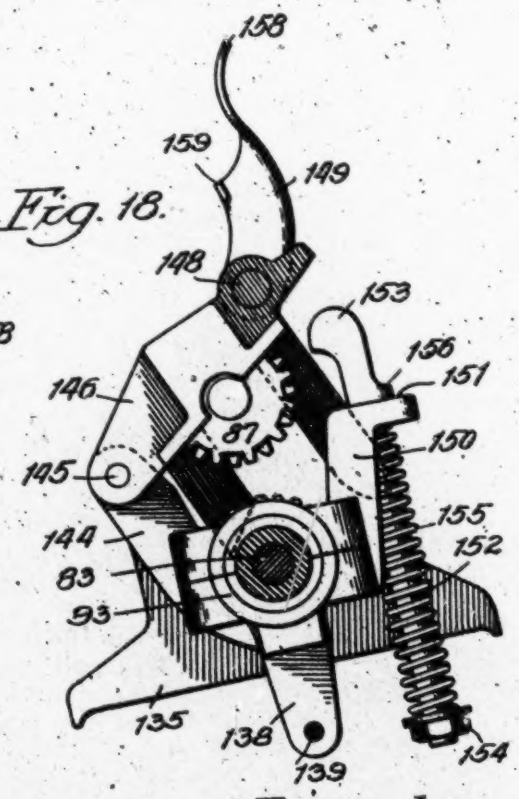


Fig. 18.



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UNITED STATES PATENT OFFICE.

ALBERT J. DREMEL, OF NEWTON, IOWA, ASSIGNOR TO THE MAYTAG COMPANY OF NEWTON, IOWA, A CORPORATION OF IOWA.

WASHING MACHINE.

1,417,306. Specification of Letters Patent. Patented May 23, 1922.

Application filed February 11, 1918. Serial No. 216,628.

To all whom it may concern:

Be it known that I, ALBERT J. DREMEL, a citizen of the United States, residing at Newton, in the county of Jasper and State of Iowa, have invented certain new and useful Improvements in Washing Machines, of which the following is a specification.

This invention relates to washing machines, and more particularly to those of the cylinder type with a wringer attached.

Among the objects of my invention is to produce a washing machine possessing the maximum of efficiency, silence, safety, convenience, simplicity, durability, and ease of operation, and having its parts so located that they can be quickly manipulated with no danger of catching the clothing or endangering the hands of the operator, or of soiling or tearing the clothes that are being washed; further to provide a novel washing cylinder in which the clothes are not only effectively rubbed but are subjected to a rapid flowing of the water thereagainst, whereby they may be more thoroughly cleansed; further to provide a wringer having an instant release in which the clothes can be quickly released in case any article becomes entwined around the rollers or clogged therebetween; further to provide a wringer which by a simple movement can be tilted to accommodate wringing in either direction, and which tilting movement will automatically carry the drain board into proper position; further to provide an adjustment to permit the wringer to be horizontally swung into any one of a plurality of adjusted positions; further to provide a novel form of cabinet for housing the cylinder and its mechanism, and arranged to automatically wipe all water from the under side of the cover in withdrawing the same; further to eliminate all wood in the construction; further to form the cylinder of aluminum whereby it will be substantially non-corrosive and of maximum sanitary value; further to reduce to the minimum the number of controlling levers; further to provide a machine which will not only effectively wash heavy clothing but will also handle the most delicate laces or the finest white clothes with even less danger of tearing and soiling than when washing by hand; further to provide means for preventing the clothes from becoming bunched together in the washing cylinder; further to eliminate excessive shock when throwing the cylinder operating mechanism into operation; further to provide a novel means for draining the tank; and such further objects, advantages and capabilities as will later appear.

My invention further resides in the combination, construction and arrangement of parts illustrated in the accompanying drawings, and while I have shown therein a preferred embodiment, I desire it to be understood that the same is susceptible of modification and change without departing from the spirit of my invention.

In the drawings:

Fig. 1 is an end elevation of a washing machine embodying my invention, and having the swinging door standing open at an angle of ninety degrees in order to show the driving mechanism.

Fig. 2 is a side elevation at right angles to that shown in Fig. 1.

Fig. 3 is a top plan view with the tank cover in its open position.

Fig. 4 is a horizontal transverse sectional view taken on a plane passing through the center of the cylinder.

Fig. 5 is a vertical sectional view through the cylinder.

Fig. 6 is a vertical sectional view showing the end of the cylinder and the gearing for operating the same.

Fig. 6ª is a detail view of the construction shown in the upper left-hand corner of Fig. 6.

Fig. 7 is a fragmentary vertical section through the wringer gearing and mechanism for operating the cylinder.

Fig. 8 is a fragmentary horizontal section taken through the cylinder operating mechanism.

Fig. 9 is a vertical section taken on the line 9—9 of Fig. 8.

Fig. 10 is a vertical section taken on the line 10—10 of Fig. 8.

Fig. 11 is a fragmentary vertical section taken on the line 11—11 of Fig. 10.

Fig. 12 is a vertical section through the wringer gearing taken on the line 12—12 of Fig. 3.

Fig. 13 is a horizontal section through the wringer operating clutch mechanism, taken on the line 13—13 of Fig. 12.

Fig. 14 is a view showing the wringer

catch, the sliding plate and the operating disk in position ready to be assembled.

Fig. 15 is a side elevation of the wringer gearing cover.

Fig. 16 is a vertical section taken on the line 16—16 of Fig. 12 and looking in the direction of the arrows.

Fig. 17 is a view similar to Fig. 16, but showing the top guard plate swung forward just prior to raising the top roll and in position to unlock the same.

Fig. 18 is a view similar to Fig. 17, but showing the top roll in elevated position.

Referring to the drawings, my improved washing machine comprises the upright frame or stand 1, having the legs 2, upon the bottom of which are suitably secured caster rollers 3. This frame is constructed entirely of metal and has secured therein the tank 4, extending vertically in which tank and adjacent one end is the partition 5. Suitably hinged at 6, as shown in Figs. 1 and 4, is the swinging door 7, this door being shown standing open at ninety degrees in Fig. 1 and closed in Fig. 4. Suitable means 8 may be provided for securing the door in closed position. Extending between the legs 2 and near the bottom thereof are the cross beams 9 upon which is suitably pivoted at 10, upon the cross pieces 12, the motor 11. The base 13 of the motor has pivotally connected at its forward end the downwardly extending rod 14, which projects through one of the cross members and is provided on its lower end with the wing nut 15, between which wing nut and the cross member is a coil spring 16 to resiliently hold the motor against excessive upward movement. This arrangement enables the weight of the motor and its parts, in conjunction with the tension of the spring 16, to act as a tightening means for the belt 17, which runs over the motor pulley 18, and the large drive wheel 19, which drive wheel is in turn suitably connected for rotating the washing cylinder 20 journaled within the tank 4. Located upon the upper corner of the tank frame is the bracket 21, upon which is mounted the wringer to be hereinafter described.

The machine is provided with a cover, 4^a, having at the forward and rear edges thereof rolls, 4^b, the forward one of which is provided with a rod, 4^c, the extending ends of which engage hooks, 4^d, at opposite sides of the machine, so that when the cover is shoved backwardly and allowed to hang at the back of the machine, these extending ends will support said cover from the hooks, 4^d. Overlapping the top of the machine and extending downwardly at the back side thereof is a wiper strip, 4^e, which is clamped between the top of the machine and the band, 4^f, so that the same may be held in position to wipe the under side of the cover 4^a, as the cover is shoved backwardly. This wipes all the surplus water from the under side of the cover and prevents the same from dripping on the floor.

The cylinder 20 comprises the spaced end plates 22 and 23, the configuration of which is best seen in Fig. 6. Secured between the marginal edges of these end plates are the circumferential washing plates 24, of which there are six in number. These plates, as will be seen in Fig. 6, are secured to the end plates by means of suitable bolts 25 or similar fastening means, and each has its forward edge 26 radially spaced from the rear edge 27 of the next preceding plate. These plates are provided at their forward edges 26 with a series of inwardly extending teeth 28, as best seen in Fig. 4, and which teeth extend perpendicularly from the body of the plate across the space just described. This forward portion of the plates 24 is of outwardly extended scoop formation 29, as clearly seen in Figs. 4 and 5. The result of this scoop formation is that upon rotation of the cylinder within the tank, the water will be forced through these spaces and between the teeth 28 into the interior of the cylinder. The plates 24 are also corrugated along their rear portions at right angles to their direction of travel, as shown at 30 (see Figs. 3, 4, 5 and 6.) Within the scoop portions are the rearwardly extending ribs 28′ as best seen in Figs. 4 and 5. The water as it enters between the teeth 28 and through the scoop portion of the plates will be forced against the clothes, which, as the cylinder rotates, will be rubbed against the corrugations 30. These corrugations have a tendency to carry the clothes upwardly for a short distance after which they will slide downwardly thereover thus producing a wash board effect. At the ends of each of the plates 24 are formed the lugs 31, by means of which these plates are secured to the marginal portions of the plates 22 and 23 by the bolts 25 referred to above. One of the plates is so formed and arranged that it may be easily and quickly removed or replaced in order to serve as a door for the cylinder. This specially formed plate is best seen in Fig. 6, at 24′, and has formed upon each end thereof the downwardly extending flanges 32, which are adapted to fit into the cutaway portions 33 of the end plates. The flanges 32 are shaped at their rear corners to fit snugly into the outwardly pressed sockets 34 formed in the end plates, while at their forward corners they are provided with the downwardly extending lugs 35 adapted to fit over the outside of the edge of the cutaway portion 33 to prevent any lateral shifting of these plates. The rear corners of this plate 24′ by fitting into the sockets 34 hold the rear edge of this plate securely in position, while the front edge is detachably secured in position by means of a suitable hook

36, or other similar device, and which hook when it is desired to remove this cover plate can be quickly unlatched to permit the removal of the plate. An inspection of Fig. 6 will show that the end plates 22 and 23 do not have their marginal portions in the form of a true circle, but at six equally spaced positions around the circumference, the curvature is such as to fall inside of the margin of a major circle, so as to provide offsets 37, which serve to give the proper inclination to the plates 24, and also to increase the space between the forward edge of these plates and the rear edge of the next preceding plate.

Each of the end plates has formed integrally therewith and on their inside face, a diametrically extending rib 38, and in assembling these end plates they are so positioned that these ribs will fall in planes at right angles to each other, the purpose for which is to break up the rolling of the clothes during the rotation of the cylinder by continually throwing them up sideways, and thus preventing them from becoming bunched or too tightly packed together. By placing these ribs at right angles to each other, this breaking up of the bunching of the clothes is accomplished to a far greater degree than would be possible were the ribs placed parallel to each other.

Secured upon one end of the cylinder is the spider 39, within which is fixed the journal 40 for rotation in the bearing 41, which bearing is open at its upper side to permit the removal of the journal in an upwardly direction therefrom. Secured upon the opposite end of the cylinder and to the end plate 22 is the annular gear 42, meshing with which is the pinion 43 mounted upon the shaft 44, journaled in the sleeve 45 mounted in the bearing bracket 46, which bracket is suitably secured to the partition 5. Mounted upon the sleeve 45 and adjacent the outer end thereof is the sleeve 47, which is formed integrally with the drive wheel 19 to rotate therewith. This sleeve 47 has fixed upon its inner end the sprocket wheel 48, and also has slidably mounted thereon the sliding clutch 49; the cross section of the sleeve 47 and of the opening in the clutch 49 being substantially square whereby to cause these parts to rotate together, and yet permit free longitudinal movement therebetween. The clutch 49 is provided around its circumference with the groove 50, in which groove and at diametrically opposite points, slidably fit the projections 51 of the arms 52 carried by the lever 53, which lever is pivoted at 54. The clutch 49 is formed on its outer end with suitable clutch teeth or projections 55, which are adapted to slide through openings 56 in the hub of the drive wheel 19. Keyed to the outer end of the shaft 44 is the recessed plate 57, which is shown in cross section in Figs. 10 and 11, and in the recesses of which are mounted the resilient pads 58. Just back of this recessed plate 57 and loosely mounted upon the shaft 44 is the flanged plate 59, the flanges 60 of which are adapted to also enter the recesses of the recess plate, so that the resilient pads 58 will lie between one of these flanges and the opposite wall of the recessed plate. Upon suitable movement of the lever 53, the clutch 49 will be caused to slide outwardly through the opening 56 in the drive wheel and the clutch tooth 55 caused to come into engagement with each of the concave sides of the flanged plate 59, and when this clutch 49 is rotated by the drive wheel 19, it will when it comes into engagement, also cause the plate 59 to rotate carrying with it the plate 57. As will be seen from an inspection of Fig. 10, when plate 59 is caused to rotate, the flange 60 will at once compress the resilient pad 58 between this flange and the opposite wall of the recess in the plate 57, thus effectively absorbing the shock that would be otherwise placed upon these parts by suddenly throwing the cylinder into rotation, which rotation, as will be seen by Fig. 8, is transmitted from the plate 57 through the shaft 44 and pinion 43 to the annular gear 42 secured upon the end of the cylinder. It may here be noted that the cylinder is rotatably mounted at its driving end by means of the stub shaft 61 secured in the hub of the arms 62, which arms are formed integrally with the annular gear 42. The stub shaft 61 at its outer end is rotatably mounted in the bearing 63 formed integrally with the gearing bracket 46, which bearing is also open towards the upper side as shown in Fig. 3 to permit this stub shaft to be removed upwardly therefrom in a manner similar to that of stub shaft 40 at the opposite end of the cylinder, thus permitting the cylinder to be vertically removed from the tank.

As a means for operating the lever 53 to throw the clutch into or out of engagement, I have provided the vertical shaft 64 journaled at its lower end in the bracket 65, and at its upper end in the bearing 66 formed in the upper part of the frame. At a point slightly above the bearing 65, the rod 64 is formed with the crank 67, which as shown engages the slot 68 in the free end of the lever 53. Pin-connected to the upper end of the shaft 64 is the handle 69, and underneath this handle for engagement therewith is located upon the top of the frame, the bearing plate 70, the opposite ends of which are provided with the raised portions 71, upon one of which the handle rests when in position to cause the cylinder to rotate, and upon the other of which it rests when the mechanism for rotating the cylinder

is thrown out of engagement. Encircling the upper shaft 64 and secured between the collar 72 and the under side of the frame is the coil spring 73, the function of which is to exert a downward thrust on the shaft 64 to thus hold the handle 69 suitably in the desired position. It will be apparent that upon rotation of the handle 69, the lever 53 will be correspondingly moved and the clutch 49 operated to cause the pinion 43 to drive the annular gear 42 or not as desired.

Suitably bolted to the bracket 21 is a second bracket 74 comprising the upper arm 75 and the lower arm 76, each of which arms is provided with suitable bearings for the sleeves 77 and 78 respectively, and in which sleeves are in turn journaled the vertical shaft 79, loosely mounted upon which are the bevelled gears 80 and 81, which in turn mesh with the bevelled gear 82 fixed upon the shaft 83, which shaft carries the lower roller 84 of the wringer. The roller 84 is rotatably geared with the upper roll 85 through the medium of the gears 86 and 87. Rotatably mounted upon the sleeves 77 and 78 and between the arms 75 and 76 is the gear housing 88, which as seen in Fig. 13 is provided with the flat front face 89, which is recessed at 90, and to which face fits the cover plate 91, which has integrally formed therewith the outwardly extending sleeve 92, upon which is journaled the bearing 93 of the main portion of the wringer frame whereby the wringer is rotatably mounted upon the sleeve 92, as best shown in Fig. 12.

The means for reversing the direction of rotation of the wringer rolls comprise the sleeve 94 (see Fig. 13) which is keyed to the shaft 79 and the exterior surface of which is substantially square in cross section. Slidably mounted upon this sleeve 94 is the clutch 95, which is provided with the circumferential groove 96, within which fits the plate 97, which is provided with the opening 98, within which opening is adapted to fit the pin 99 which is eccentrically carried by the disc 100. This disc is fixed upon the end of the shaft 101 to rotate therewith when this shaft is rotated by a suitable manipulation of the handle 102 mounted upon the sleeve 103. From this construction, it will be seen that by throwing the handle 102 to one side or the other, the shaft 101 will be correspondingly rotated, which in turn rotates the disc 100, causing the plate 97 to be elevated or lowered, thus elevating or lowering the sliding clutch 95, the ends of which are suitably formed to engage corresponding clutch surfaces in the gears 80 and 81. These gears being located on diametrically opposite sides of the gear 82 will, as is obvious, cause the same to rotate in one direction or the other, in accordance with which of the gears 80 or 81 is being driven by the clutch 95.

In order to lock the clutch 95 in elevated or lowered position, I have provided the disc 100 with a plurality of openings 104, within any one of which may engage the tapered end 105 of the pin 106, which pin is resiliently held in engagement in said openings by the coil spring 107 mounted in the opening 108 and held between the end of the pin 106 and the inner surface of the plug 109. This as will be apparent is sufficient to hold these parts against any ordinary pressure or jar and yet will permit these parts to be moved upon sufficient pressure being exerted upon the handle 102. It will be noted that the shaft 101 is fixed to the sleeve 103 by means of the pin 110.

The lower arm 76 of the bracket 74 is extended downwardly to form the leg 111, which leg is suitably bored and in which is journaled the lower end of the shaft 79. This leg 111 is provided at its end with the flange 112, to which flange is suitably bolted the integral gear housing 113, which housing is provided at its opposite sides with the bearings 114 and 115, within which is journaled the shaft 116. Upon the shaft 116 is fixed the bevelled gear 117, which in turn meshes with the bevelled gear 118 fixed upon the lower end of the shaft 79. The shaft 116 projects a substantial distance beyond the end of the bearing 115 and has fixed thereupon the sprocket wheel 119, which sprocket wheel is in alignment with the sprocket wheel 48 described above, and over which two sprocket wheels runs the sprocket chain 120, by means of which rotation is transmitted from the drive shaft 44 to the shaft 116, and in turn to the wringer rolls 84 and 85. Suitably placed over the sprocket wheel 119 and bolted to the flange 112 by bolts 121 and to the integral housing 113 by bolts 122 is the housing 123, which is provided in its inner side with the slot 124, whereby the same may be slid in position over the bearing 115 preparatory to being bolted in place.

From the construction described above, it will be seen that the wringer is mounted for horizontal rotation upon the shaft 79 through the medium of the sleeves 77 and 78, and in order to permit the wringer to be locked in any one of a plurality of horizontal positions, the lower arm 76 of the bracket 74 is provided with a flange 125, which flange is in turn provided around its circumference with a plurality of notches 126. Extending downwardly from the cover plate 91 of the gear housing and as best seen in Fig. 15, is the projection 127, which projection is provided with the opening 128 in line with which is the cylindrical bore 129. Slidably mounted within the opening 128 is the stem 130, which carries upon its

outer end the handle 131. Encircling this stem and located within the cylindrical bore 129 is the coil spring 132, which spring is suitably compressed between the closed end of the cylindrical bore and the collar 133 secured upon the stem 130, constantly impelling this stem inwardly, whereby its tapered end 134 may be brought into engagement with any one of the notches 126 desired, thus locking the wringer in any one of a plurality of horizontal positions, whereby the same may be made to wring clothes either directly from the tank, or from a separate rinsing tub, into a separate basket, or in any other position in which it is desired to operate the same. As will be obvious, the stem 130 can be pulled outwardly by pressure exerted upon the handle 131, whereby to release the end 134 from the notches 126 preparatory to rotating the wringer into a different position.

As stated above, the wringer is mounted for vertical rotation upon the sleeve 92, whereby the wringer frame and the drain board 135, which is secured thereto at the bottom, may be quickly and suitably tilted towards either side, whereby to accommodate wringing in either direction. In order to lock the wringer in the desired one of these tilted positions, I have provided a suitable locking means which I will now describe. As shown in Fig. 15, the projection 127 of the cover plate 91 is provided with the apertures 136 and 137, and the downwardly extending leg 138 of the wringer frame is also provided with an aperture which can be brought into registry with either one of the apertures 136 or 137 upon suitable rotation of the wringer upon the sleeve 92. Extending through the aperture in the leg 138 is the rod 139, which as shown in Fig. 2, extends at its outer end through the apertured projection 140. This rod is formed at its free end with a suitable handle 141, and at a point removed from the end with the collar 142. A coil spring 143 encircles the rod 139, and is compressed between the projection 140 and the collar 142, whereby to impel the rod 139 in a direction towards the left in Fig. 2. It will thus be seen that when the aperture in the leg 138 is brought into registry with either of the apertures 136 and 137 that the rod 139 under the action of the spring 143 will enter these apertures, and thus lock the wringer in the desired tilted position. The drain board 135 being secured to the wringer will at the same time that the wringer is tilted, be automatically thrown into proper position to accommodate wringing in the direction for which the wringer is tilted. These two positions of the wringer are indicated in Fig. 16, it being shown in full lines as tilted to one side, and in dotted lines as tilted to the opposite side.

The wringer comprises the end bearing 93, which as explained above is rotatably mounted upon the sleeve 92, and at its opposite end is provided with the bearing 143, between which bearings are secured, or if desired, formed integrally therewith, the drain board 135. The lower roll 84 is journaled at one end in the sleeve 92 and at its opposite end in the bearing 143, and as explained above is in driving engagement with the upper roll 85 through the medium of the gears 86 and 87. Formed integrally with the lower bearing 93 is the upwardly extending arm 144, to which is pivotally connected at 145 the upper bearing 146, which at its forward end is provided with the opening 147, (see Fig. 3) there being one of these upper bearings for each end of the wringer. Rotatably connected with the upper bearings 146 by means of pins 148 passing through the openings 147 is the upper roll guard plate 149. Extending upwardly from the lower bearing 93 and on the side opposite from the arm 144 is the arm 150, which at its upper end is provided with the outwardly extending flange 151, through which flange slidably extends the rod 152, provided at its upper end with the hook 153, which hook is adapted to take over the pin 148. Encircling the rod 152 and confined between the flange 151 and head 154 is the coil spring 155, the function of which is to exert a continuous downward pressure upon the rod 152, which rod is provided near its upper end with the projection 156 for engagement with the upper side of the flange 151, whereby to limit this downward movement. There is provided a similar arrangement of bolt and hook at each end of the wringer, as shown in Fig. 2. The pin 148, as best shown in Fig. 16 is slotted at 157, the function of which slot is to cause the remaining portion of the pin to act as a cam surface, whereby as will be understood from an inspection of Fig. 16, a half rotation of pin 148 will release the hook 153 and allow the rod 152 to move downwardly under action of spring 155. This half rotation of pin 148 is effected by grasping the handle 158 of plate 149 and swinging the same through substantially one hundred and eighty degrees towards the front, thus in turn rotating pin 148 to release hooks 153 as explained above. Fig. 16 shows the plate 149 before being rotated. Fig. 17 shows this plate after being rotated approximately one hundred and eighty degrees to the front, and clearly illustrates the manner in which the hook 153 is released. Immediately upon this release of the hook, the upper bearings 146 may be swung upwardly carrying therewith the upper roll 85, thus providing a structure which can be quickly manipulated in order to release any bunched or entangled clothes between the rolls when such is necessary. As is apparent the upper bearings

may be quickly and easily locked in operative position by a reverse operation of the parts just described. In order to hold the guard plate 149 in proper spaced relation from the upper roll, there is provided on this plate a lug 159 which comes in contact with a suitable bearing surface on the upper bearing in order to hold this plate in the desired position.

In order that the water may be quickly and easily drained from the tank, I have provided in the bottom thereof the opening 160. On the bottom of the vertically extending rod 161 there is secured the valve 162, which is adapted to tightly seat in the upper portion of the opening 160, whereby to prevent any water from passing therethrough until the valve is raised. In order that the valve may be raised to drain the tank, I have provided at the upper end of the rod 161 the lever handle 167, to which, as shown, the upper end of the rod 161 is pivotally connected. The handle 167 is suitably fulcrumed at 163 and is provided in its front portion with the short flange 164, which flange is adapted to engage with the teeth 165 of the rack 166 suitably secured to the side of the tank and adjacent the top thereof. As will be obvious by disengaging this flange from the teeth 165 and elevating the handle 167, the valve 162 will be raised away from the opening 160, and the water permitted to flow therethrough. In closing this valve, all that is necessary is to depress the handle 167 until the valve is closed and lock the flange 164 in engagement with the teeth 165, thus providing means whereby the handle will be firmly secured to hold the valve in closed position. There is sufficient resiliency in the handle 167 to insure the valve 162 being securely locked in closed position.

Having now described my invention, I claim:

1. In a washing machine a washing plate having its front edge in the form of a scoop, ribs in said scoop extending at right angles to and rearwardly from said front edge teeth adjacent said front edge, and the portion of said plate in the rear of said scoop being corrugated in a direction at right angles to said ribs.

2. In a washing machine, a washing cylinder comprising a plurality of circumferential plates, each plate at its forward edge being radially spaced from the rear edge of the next preceding plate, said forward edge being curved to form a scoop, and a plurality of ribs in said scoop, to reinforce the scoop and prevent bending thereof.

3. In a washing machine a washing cylinder comprising a pair of end plates, a plurality of circumferential plates secured between the marginal portions of said end plates whereby to leave an opening substantially of the size of one of said circumferential plates, and a separate circumferential plate removably fitted in said opening, the forward edge of each of said circumferential plates being scoop shaped and spaced from the rear edge of the next preceding plate with a plurality of teeth extending across said space, and a plurality of ribs extending rearwardly from the forward edge of each plate and transversely thereto, inside of said cylinder.

4. In a washing machine a tank, a lid on said tank, and means operable upon the opening of said lid for automatically removing excess moisture therefrom.

5. In a washing machine a tank, a lid slidably mounted on said tank, and means over which said lid slides in opening to wipe excess moisture therefrom.

6. In a washing machine a tank, a lid slidably mounted upon said tank and a wiping pad secured to said tank to contact with the underside of said lid during withdrawal whereby to automatically remove excess moisture from said lid in opening the same.

In witness whereof, I hereunto subscribe my name to this specification in the presence of two witnesses.

ALBERT J. DREMEL.

Witnesses:
E. H. MAYTAG,
F. MAYTAG.

1158 (Plaintiff's Exhibit 30, Letters Patent No. 1,391,214 to H. F. Snyder, September 20, 1921.)

800

H. F. SNYDER.

WASHING MACHINE.

APPLICATION FILED DEC. 18, 1916.

1,391,214. Patented Sept. 20, 1921.

Fig. 1.

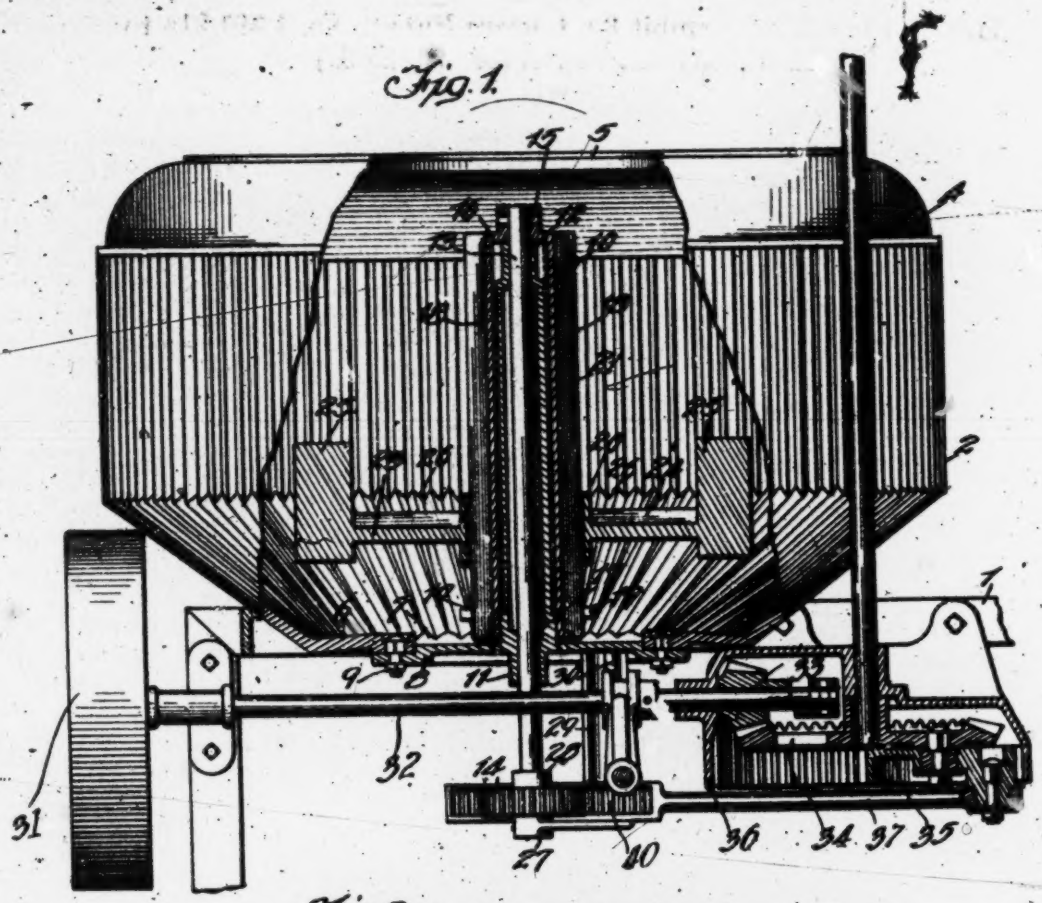
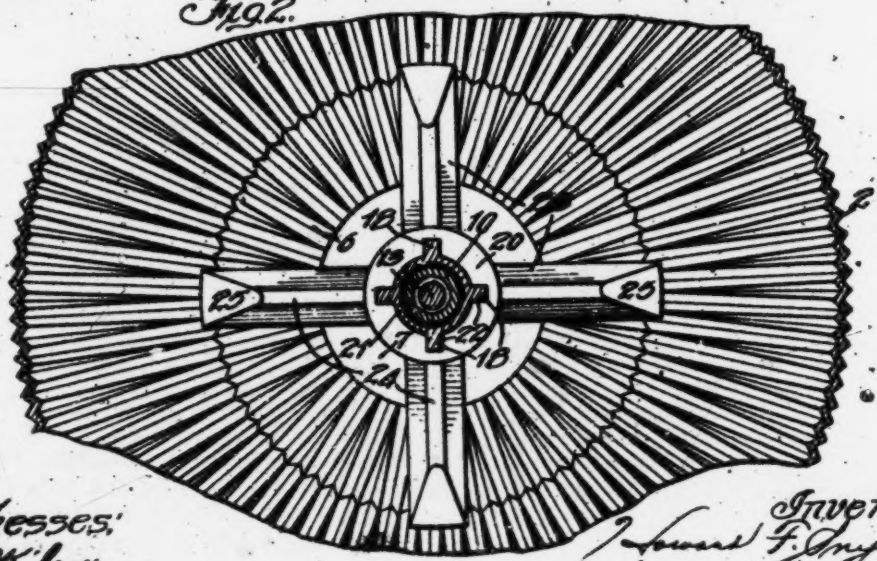


Fig. 2.



Witnesses:
W. P. Kilroy
M. Q. Miller

Inventor:
Samuel F. Snyder
By William R. Lane
Atty.

HOWARD F. SNYDER, OF NEWTON, IOWA, ASSIGNOR TO THE MAYTAG COMPANY, OF NEWTON, IOWA, A CORPORATION OF IOWA.

WASHING-MACHINE.

1,391,214. Specification of Letters Patent. Patented Sept. 20, 1921.

Original application filed March 11, 1915, Serial No. 13,560. Divided and this application filed December 18, 1916. Serial No. 137,528.

To all whom it may concern:

Be it known that I, HOWARD F. SNYDER, a citizen of the United States, residing at Newton, in the county of Jasper and State of Iowa, have invented certain new and useful Improvements in Washing-Machines, of which the following is the specification.

This invention relates to washing machines and gearing therefor, and particularly to dolly construction and dolly operating mechanism for such machines.

It is an object of this invention to provide a dolly which acts upon the clothes from below instead of from above, whereby the action of the dolly will not be affected by the amount of clothes in the tub, and a very few clothes may be washed as perfectly as the ordinary full charge for the machine.

This application is a division of my application, Serial Number 13,560, filed March 11, 1915.

In the drawings, Figure 1 is an elevation partly in section of the washing machine constructed according to my invention.

Fig. 2 is a sectional plan view of a portion thereof.

In the drawings, 1 refers to the frame or bench of a washing machine, preferably made up of metallic angle bars. 2 represents the tub mounted in said frame or bench. The tub 2, it is to be particularly noted, is of peculiar and novel form and includes a tapered bottom 3 and a dome 4 and lid 5. It is preferably cast in one piece save for the lid, and from aluminum. The bottom 6 of the tub is provided with a central aperture 7, which is closed by the circular plate 8, fastened therein by means of bolts such as 9. Preferably cast integral with the plate 8, is the upstanding sleeve 10 having bearings 11 and 12 at its upper and lower ends in which is mounted the vertical dolly operating shaft 13 having upon its lower end a pinion 14 by which it is driven by mechanism and in a manner now to be described.

Secured to the top of the shaft 13, as for instance by the pin 15, is the sleeve 16 which overlaps the sleeve 10 and is snugly fitted thereabout on the integral collar 17 at the bottom of the sleeve 10 whereby wabbling of the sleeve 16 is prevented. The sleeve 16 is provided with a number (in this instance four) of blades 18 and adjacent its bottom is provided with outstanding pins or rests 19.

The dolly proper is of a novel form comprising an elongated central hub 20 having a central aperture 21 and slots 22 so as to be slidable up and down upon the sleeve 16 and to be engaged with the blades 18 thereof to prevent rotative displacement with respect thereto. Projecting radially from the hub 20 are the arms 23 which are rounded on their upper surfaces, as shown at 24, and are provided at their outer ends with the washing blades 25 which project a considerable distance upwardly from the arms 23 and downwardly to the level of the bottom of the hub 20. The sides and bottom of the tub are provided with the corrugations 26 which assist in the stirring action of the dolly in an obvious manner.

In operation the dolly is placed upon the sleeve 16 and slides down thereon until the bottom of the collar 20 rests upon the pins 19 after which the water and clothes may be placed in the tub and the machine operated in the ordinary fashion, the washing blades 25 gripping the clothes to carry them back and forth in the tub and rubbing them against the corrugated sides thereof, and the corrugations 26 assisting in the stirring action. By this means the clothes are operated upon from below and it is immaterial how full a charge is put into the machine, the operation upon the clothes being the same no matter whether few or many are being washed at one time. Moreover, the tapered bottom of the tub coöperates with the new form of dolly so as to cause the clothes at all times to come into operative engagement therewith.

The pinion 14 on the bottom of the shaft 13 is interposed between the bearing 27 and the collar 28, the bearing 27 being integral with the bracket 29 which has thereon the upstanding web 30 which is rounded at its outer end. The bracket 29 is preferably formed integrally with the plate 8, which closes the bottom of the tub.

The mechanism for driving the pinion 14 comprises a wheel 31 which operates through a shaft 32 to drive the beveled pinion 33, which drives the beveled gear 34, which carries a small pinion 35, which is trailed around inside the crown gear 36, operating the link 37, which has a rack 40, to mesh with the pinion 14, all as more fully described in my co-pending application above referred to.

In operation, power communicated to the

fly wheel 31 will cause the shaft 13 to oscillate operating the dolly so that the same will act upon the clothes from underneath, as above explained.

Having now described my invention, I claim:—

1. In a washing machine, a tub comprising a corrugated body having a downwardly tapered bottom, having a substantially flat portion at the bottom of said taper, said flat portion having an opening therein, a detachable closure for said opening, said closure having an integral sleeve extending upwardly into said tub, an oscillatory shaft journaled in said sleeve, a carrier secured to said shaft, a dolly slidably mounted on said carrier, said dolly having upwardly projecting blades, the diameter of said dolly being such as to project slightly over said tapered bottom, whereby to give the maximum rubbing effect on the clothes.

2. In a washing machine, a tub having a bottom provided with an enlarged opening, a removable closure for said opening, a sleeve integral with said closure and extending upwardly into the tub, an oscillatory shaft journaled in said sleeve, a carrier secured to said shaft and having a rotating fit with the bottom of said sleeve, and a dolly slidably mounted on said carrier and having upwardly extending clothes engaging members.

3. In a washing machine, a tub comprising a corrugated body having a downwardly tapered bottom, having a substantially flat portion at the bottom of said taper, a sleeve extending upwardly into said tub from said flat portion, an oscillatory shaft journaled in said sleeve, a carrier secured to said shaft, a dolly slidably mounted on said carrier, the diameter of said dolly being such as to project slightly over said tapered bottom, whereby to give the maximum rubbing effect on the clothes.

In witness whereof, I hereunto subscribe my name to this specification in the presence of two witnesses.

HOWARD F. SNYDER.

Witnesses:
L. S. Lyday,
Guy Wooton.

Plaintiff's Exhibits 31A to F. 80

U. S. D. C. W. D. Mo. W. D.

THE MAYTAG COMPANY

vs.

GENERAL ELECTRIC SUPPLY CORPORATION

IN EQUITY 2892

DEFENDANTS EXHIBIT 31. a42

NAME OF EMPLOYEE Stephen, Joe 4052 10-25-34

	YEAR	MONTH	DAY
DATE OF BIRTH			
DATE OF EMPLOYMENT	08	8	20
DATE OF CERTIFICATE	18	12	30

POLICY NO. 1110 CERT. NO. 516

	NAME	RELATIONSHIP	DATE OF CHANGE
ORIGINAL BENEFICIARY	Estate		
CHANGED BENEFICIARY			
CHANGED BENEFICIARY			

SEX	COLOR	AMOUNT OF INSURANCE							
TOTAL AMOUNT	CHANGED AMOUNT	DATE OF CHANGE	CHANGED AMOUNT	DATE OF CHANGE	CHANGED AMOUNT	DATE OF CHANGE	CHANGED AMOUNT	DATE OF CHANGE
1000	2000	Limit						

CANCELED | REINSTATED | CANCELED | REINSTATED

REMARKS:

4052

Printed in U. S. A. by Prudential Press

NAME OF EMPLOYEE THORNTON CHARLES W. AGE 26

POLICY NO. 1110 DATE OF EMPLOYMENT 17 5 16

CERTIFICATE NO. 524 DATE OF POLICY 19 18

	NAME	RELATIONSHIP	DATE OF CHANGE
ORIGINAL BENEFICIARY	CATHERINE THORNTON	WIFE	
CHANGED BENEFICIARY			
CHANGED BENEFICIARY			

SEX	COLOR	AMOUNT OF INSURANCE							
TOTAL AMOUNT	CHANGED AMOUNT	DATE OF CHANGE	CHANGED AMOUNT	DATE OF CHANGE	CHANGED AMOUNT	DATE OF CHANGE	CHANGED AMOUNT	DATE OF CHANGE
500								

REMARKS:

Part of Plaintiff's Exhibit 31A to F. 805

NAME OF EMPLOYEE: 2- Miller, Geo. L. x 4003 | AGE AT ISSUE: 39 | 7/12/81 to

POLICY NO. 1110 CERT. NO. 44421 | DATE OF EMPLOYMENT: YEAR 19 | MONTH 12 | DAY 1

	NAME	RELATIONSHIP	DATE OF CHANGE
ORIGINAL BENEFICIARY	Roy L. Miller	Wife	
CHANGED BENEFICIARY			
CHANGED BENEFICIARY			
CHANGED BENEFICIARY			

Lapsed

AMOUNT OF INSURANCE

INITIAL AMOUNT	CHANGED AMOUNT	DATE OF CHANGE	CHANGED AMOUNT	DATE OF CHANGE	CHANGED AMOUNT	DATE OF CHANGE	CHANGED AMOUNT	DATE OF CHANGE
5 00.	1000.	12/1/24	1100.	12/1/25	1200	12/1/26	1300	12-1-27
1400	12-1-28	1500	12-1-29	1600	12-1-30	1700	12-1-31	

REMARKS: 1800 12-1-32 1900 12-1-33 2000 12-1-34 - Lapsed

TERMINATION DATE

NAME OF EMPLOYEE: Moran, David L. 3025 | AGE AT ISSUE: 20 | 7/6/98

POLICY NO. 1110 CERT. NO. 247 | DATE OF EMPLOYMENT: YEAR 1917 | MONTH 1 | DAY 22

Date Ceased 1918 - 12 - 30

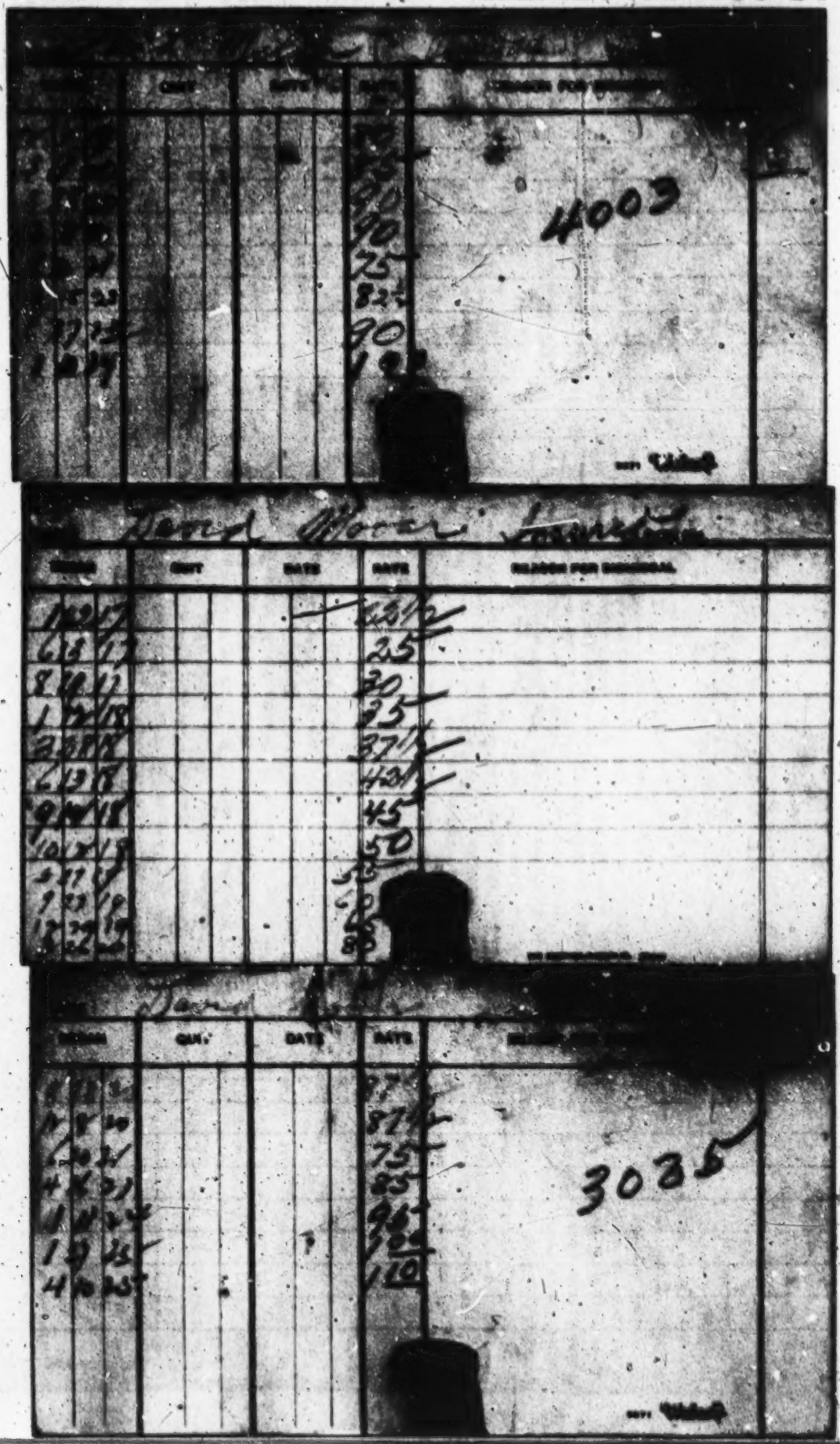
	NAME	RELATIONSHIP	DATE OF CHANGE
ORIGINAL BENEFICIARY	Mrs. Eleanor Moran	Mother	
CHANGED BENEFICIARY	Miss Moran	Sister	4-26-29
CHANGED BENEFICIARY			
CHANGED BENEFICIARY			

AMOUNT OF INSURANCE

Orig	1000	12/1/25	1100	12/1/26	1200	12/1/27	1300	12-1-28
1400	12-1-29	1500	12-1-30	1600	12-1-31	1700	12-1-32	

REMARKS: Lapsed DEC 30 1934

Part of Plaintiff's Exhibit 31A to F. 807



Society

THURSDAY:
Twentieth Century club with Mrs. L. [illegible]
Social circle with Mrs. Jessie Bond.
P. E. O. club with Miss Vera Morris.
[illegible] auxiliary with Miss [illegible] Ware.
Town Last club with Mrs. C. E. Hu[illegible]

FRIDAY:
U. A. C. club with Mrs. W. H. Mock.
L. C. W. club with Mrs. Marian [illegible]

SATURDAY:
[illegible]heon at Mr. Jay Clark home.
[illegible] Chapter [illegible] the Delphian so[illegible]

[illegible]TERTAIN TO HONOR REV. FURNISS AND FAMILY

The ladies of the [illegible]byterian church will preside at a reception Friday evening, which will be held in compliment to Rev. George Furniss and family who are soon leaving the city. The first part of the evening will be devoted to a short program with music and readings followed by a social hour. Refreshments will be served by the committee. Invitations have been issued to all members of the church and their families.

REBEKAHS OBSERVE CHILDREN'S DAY

The children of the Rebekah lodge [illegible] were guests at the Children's Day program Wednesday evening which was held in the I. O. O. F. [illegible] More than 250 Rebekahs [illegible] enjoyed a social [illegible] with games and miscellaneous [illegible] which was given by [illegible] and the older folks dressed in their childhood costumes. The latter part of the evening was spent in dancing and the serving of refreshments. Those in charge of the entertainment were Mrs. A. C. Travitt, Mrs. Alta Baker and Zelta Malloy.

[illegible] DIVISION WITH MRS. HIXON

The [illegible] division of the Methodist Episcopal Aid society were entertained at the home of Mrs. H. L. Hixon Wednesday afternoon. A regular meeting and informal afternoon was spent.

[illegible] MEETING HELD [illegible] EVENING

[illegible] Bostrom [illegible] Methodist Episcopal church held a delightful meeting at the home of Miss Mae [illegible] Wednesday evening. A social hour was given and the [illegible] offering was taken for the hospital fund to be used in aiding the medical work in China. Special music was furnished by Misses Juanita Gilbert, Elizabeth McClary, Ruth Reed and Miss Lois. One of the most entertaining features of the evening was the paper given on Dr. Mary Stone, a returned missionary from China, by Mrs. W. L. Anderson who heard Dr. Stone lecture in Des Moines recently. Plans were also made to send delegates to the Standard Bearer Rally which will be held at Grinnell in June. Following the business meeting and social hour refreshments were served by the hostess assisted by her sister, Miss Lydia Veith to the twenty-two present which included the three new members Misses Wilma Foreman, Juanita Gilbert and Juanita Tony and Mrs. John [illegible]

BISHOP McDOWELL DIVISION WEDNESDAY

The Bishop McDowell division of the Methodist Episcopal church met at the home of Mrs. Martha Smith Wednesday afternoon. The time was spent in sewing and social entertainment followed by the serving of a light luncheon by the hostess, who was assisted by her daughter Mrs. Ida Gardner.

BISHOP BERRY DIVISION MEETING HELD WEDNESDAY

Members of the Bishop Berry division of the Methodist Episcopal church were entertained at the home of Mrs. D. S. Fleck Wednesday afternoon. The regular business meeting and social hour furnished the afternoon diversion. At the close of the afternoon the hostess served light refreshments to fifteen guests, including the three new members, Mrs. P. O. Stephens, Mrs. Orville Carnahan, and Mrs. M. J. Berry.

DINNER HONORS WEDNESDAY

Mr. and Mrs. Frank Butler entertained at dinner Wednesday in compliment to Mrs. John Allen and her son Sam Johnson who left Wednesday evening for Tulsa, Oklahoma. Mrs. John Poole and son Donald and Mrs. Simon Petermeier of Baxter were present.

BIBLE STUDY DEPT. ARRANGES PROGRAM

The Bible Study department of the Woman's club met in the library club rooms Wednesday evening and decided upon a couse of study for the coming year. The historical books of the Old Testament will be the study for the coming year and the leader will be Miss Lucy E. Hall.

DAVIDSON-BRADT MARRIAGE ANNOUNCED

The announcement of Miss Gladys Davidson's approaching marriage to Mr. Roy Bradt was made last evening at a pretty blue bird dinner party which was given at her home on Third Avenue Southeast. The rooms were charmingly decorated in flowers and dainty pink and blue appointments. Spring flowers of various hues and pink shaded candles were used in the living room decorations. The dining room was elaborately adorned in sweet peas and blue candles in the old English sticks and the table banked with originality where the most unique designs were employed. The cupid message was contained in little notes concealed in a basket hanging from the chandelier. Fastened to each note was a pink and blue streamer leading to a little blue bird on a tumbler at the side of each plate.

When the bird was removed the little [illegible] which the concealed in the nest was brought forth and the secret message read "Gladys Davidson, May Bradt, June 16". Other [illegible] were cut glass baskets of sweet peas tied with large bows of pink and blue tulle and little sweet pea place cards. Covers were laid for: Mrs. O. M. French, Mrs. Carroll Birchard, Mrs. Raymond Hanks, Mrs. Frances Shutty, Misses Esther Beatty, Irene Ritter, Irene and Grace Geddes, Ruth McCardell, Marguerite Carl, Mabel Woodrow, Gladys Furniss, Reva Meredith, Irene Clark, and Florence Smith and Fern Stover of Des Moines.

The three course dinner was served by Misses Mildred Furniss and Isabel Rasmussen. The evening was spent with music and informal pastimes.

LUTHER LEAGUE GIVES WEINER ROAST WEDNESDAY

The Luther League of the Lutheran church gave a weiner roast at Lamb's grove Wednesday evening when they entertained more than thirty-five young people at a frolic in the woodlands where primitive methods were used in the preparation of the food. The affair was a decided success.

ARMSTRONG SCHOOL GIVES BOX SUPPER AND PROGRAM

A more ideal setting or entertainment has never been found for pure fun and merriment than the little country school house where the neigabors of the community gather for, their box supper and program. Armstrong school was the scene for an affair of this kind Wednesday evening when the teachers and the pupils presided as hosts at a box supper and program which had been arranged by the instructor, Miss Rena Cox. The program was:

Reading—Marion Conn.

Folk dances (Riga-ma-gig) Marion Conn, Wanda Scholes, Irene Hughes, Frances Hughes, George Hasselbrink, Chris Hasselbrink, Wanda Cox.

Pantomime, "Springtime" school.

Reading—Donald Callison.

Playette, "The Magic Charm"—Queen of the Elves, Marion Conn children—Wanda Scholes, Francis Hughes, Irene Hughes, George Hasselbrink and Chris Hasselbrink.

Reading—Teddy Deutsch.

The Scarlet Poppy.

The typical flower of the British grain fields is the scarlet poppy. In June when the wheat stalks have not yet reached their full height, many grain fields appear from a distance to have nothing but poppies in them and are a sheet of blazing scarlet. The long deeply cut leaves of the plant, of which each division ends in a bristle, are in themselves handsome.

Marvelous Banyan Tree.

The giant banyan under which Alexander is said to have camped with 7,000 men, only measures nearly 1,000 feet around the head, contains about 3,000 trunks and forms a dense canopy through which the sunshine never penetrates. Several other species also propagate in like manner.

Why Not Bust Him?

Another form of the double-distilled essence of post whose framework above his shoulders is composed of re-enforced concrete, is the unimproved nuisance who insists upon inventing the current of pedestrian traffic of a crowded street on the wrong side of the pavement.

LaFollette as Leader

By The Associated Press

PORT DODGE, Iowa, May 26—Senator Robert M. LaFollette, Wisconsin, must lead the liberty forces of America in a new third party of the common classes in 1920 as Abraham Lincoln did the new Republican party to victory in 1860 Lester P. Barlow, national secretary of the World war veterans said today before the convention of the Iowa Federation of Labor in convention here.

Early Dynamos.

The principle of electro-magnetic induction, on which the operation of the dynamo-electric machine is based, was discovered by Michael Faraday of London in 1831. The first machine to give continuous current was that of Sir Charles Wheatstone, in England, in 1841. One of the earliest successful dynamos was that of Siemens, 1856. Gramme invented the ring winding in [illegible]

Vegetables for Health.

The Greek philosophers believed that a dish of boiled beets, served with salt and oil, was an aid to mental effort, and it is said that Pharaoh fed his pyramid builders on radishes. The Arabians have always eaten artichokes for liver trouble and in different parts of the world they are regarded as particularly wholesome for men and women who lead a sedentary life.

Curious and Useful Plant Family.

The nightshade family, Solmanaceæ, is a most curious and useful one, for aside from the tomato, potato and tobacco sections, many of the plants yield poison, yet close species are edible as the ground cherry, chili pepper, eggplant, pepino, melon pear, etc.

Under The Big Tent

One Big Week
Beginning
MONDAY, MAY 24th
THE FAMOUS
Chase-Lister
Theatre Co.
(Good Enough for Anybody)
Just East of the Big Store
MONDAY NIGHT
"The Marriage Question"
TUESDAY NIGHT
"The Frame Up"
WEDNESDAY
"The Home"
"The [illegible]
FRIDAY N[illegible]
"Her Unbo[illegible]
The big play of [illegible]e week.

U. S. D. C.
W. D. No. W. D.
THE MAYTAG COMPANY
vs.
GENERAL ELECTRIC SUPPLY CORPORATION
IN EQUITY 2892
PLAINTIFF'S EXHIBIT 32.
DEFENDANTS EXHIBIT
809

RIALTO

PLAINTIFF'S EXHIBIT 33.

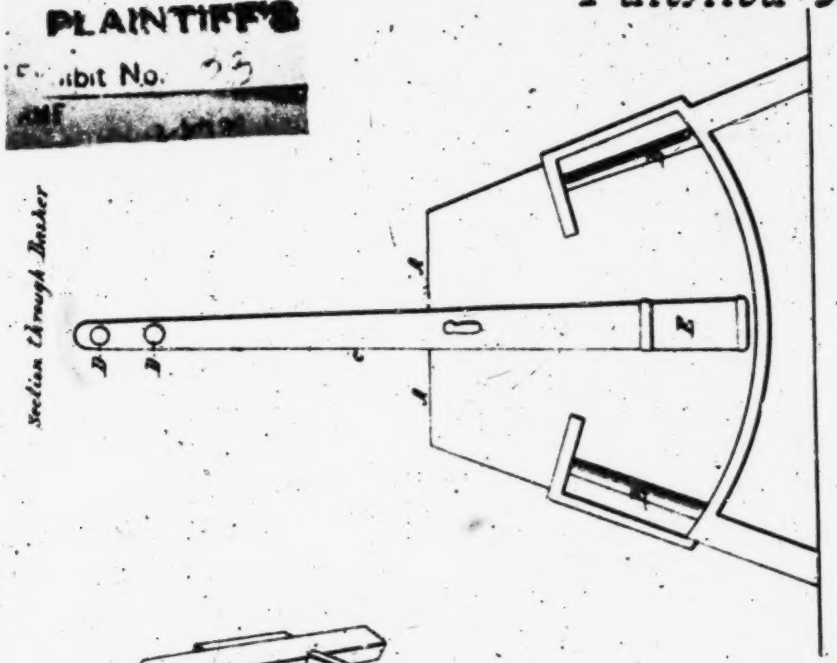
S. Tucker,

811

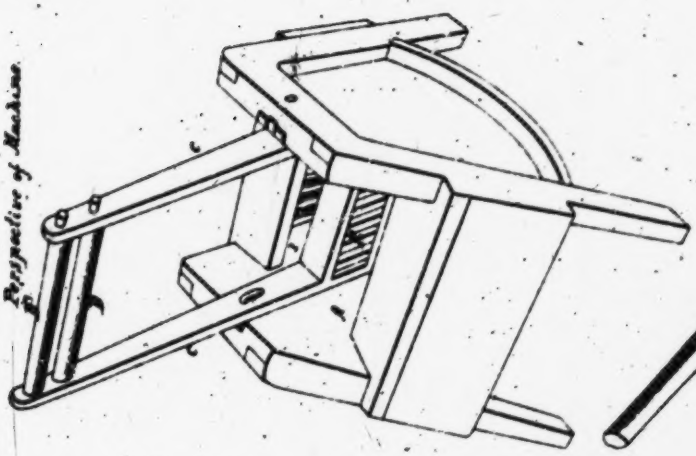
Washing Machine,

Patented Jan. 12, 1809.

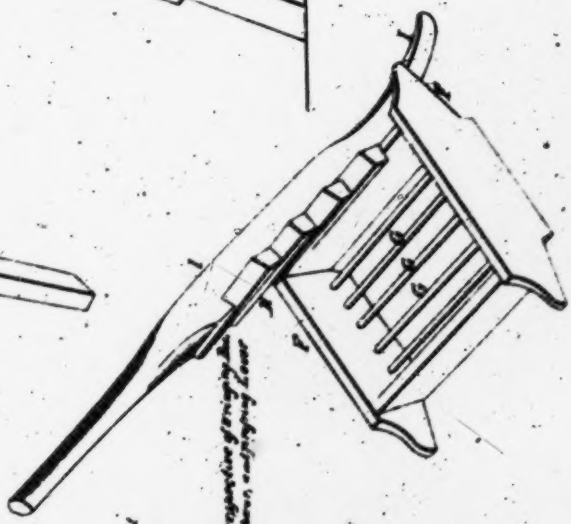
PLAINTIFF'S
Exhibit No. 33
[illegible]



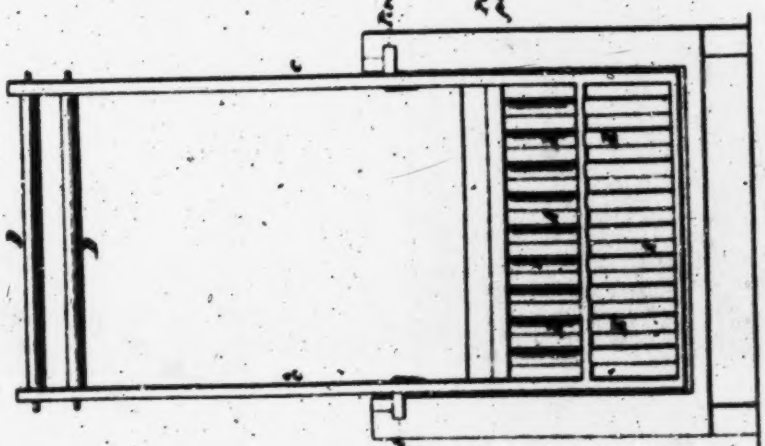
Section through Bucket



Perspective of Machine



Perspective of principal parts, reduced Scale



Bottom through Rivets

Roof

July 12. 1808 27

Ebenezer Lester

LETTERS PATENT. Issued July 12. 1808.

The Schedule referred to in these Letters Patent and making part of the same containing a description in the words of the said Ebenezer Lester himself of his Washing Machine

Take two pieces of Board say 5 feet long and 18 inches wide, Plane them perfectly smooth, then joint both edges straight, then with a sweep saw 4 feet long sweep the under edge of each side piece beginning 9 inches from the center of each which will leave the bottom about 18 in. flat. Then take a number of pieces of boards for the bottom, plane them smooth and groove them together, painting each joint; then take a strip of cloth and secure on the lower edge of the two side pieces and then nail the bottom on, then take two pieces, say 15 in. wide & 18 in. long. or as long as the machine is wide for the end pieces, make them perfectly smooth and nail them on so that they may be perfect tight, and the vessel which holds the water is compleat. It is to be observed that the ends are to be sawed from six to ten inches, and that a piece of board of six or eight inches in width is to be securely fixed on the tops of the machine and join with the ends. Then take two pieces of two inch plank 3 ft. long, and two of 22 in long and six wide, plane & joint these smooth and frame them together for the Washmachine to be secured on. Or take two pieces of Plank 22 in long and 6 in wide, saw a piece out of one edge of each leaving 1½ inch at each end of each to receive the machine. Then with a piece of board dovetail these together about 2 ft from each other, then take 4 strips of plank say 4 feet long & 3 inches wide, plane and joint them smooth & true. Then in the upper end of each mortise a hole of 1½ inch square. Then bore four inch holes in the lower end of each piece say 3 inches apart, about this one a gauge to receive a piece of plank with a dovetail. Then take four inch Rolls of sufficient length say 18 inches long [illegible] 1½ to 2 inches diameter

PART OF PLAINTIFF'S EXHIBIT 33. 813

part of them into the frame below the lowest plank, then take two pieces of plank say twenty inches long, plane and joint them true, then [illegible] make a square to receive the square on the upper end of the swinging frame. without this turn a pivot one inch and a quarter long and one inch in diameter, or the swinging frame may be made with spring and hung with a hinge with a spring between the standing parts and the frame. Then take two pieces of boards say 10 inches wide and four feet and one half long. nail this on the outside of the machine from the center, then take another piece of the same width say 2 ft. [illegible] one end of this on the upper edge of the machine as a lining [illegible] which is nailed on the outside. Then take a piece [illegible] inches long and 6 inches wide and on one edge of this saw a square [illegible] to receive the first on the large upper rolls. setting them [illegible] from 18 to 24 inches apart, nail this to the first board and resting [illegible] edge on the lining. This standard may be made of plank by being [illegible] the depth of the washing machine and at the upper end to receive the piece which supports the swinging frame. Then take two pieces of plank or timber say 5 ft long and reduce them suitable for handles. Secure these to the upper large rolls on which the swinging frames are fastened. Then take a small pole and secure it in the frame on which the machine is secured, to this fasten a line and the other end of the line to one handle, on a weight of six pounds will answer the same purpose, or putting a spring on the lower end of one of the swinging frames so that it will work by pressing against the piece on the top of the machine will be equally good, as they will save one hand in the working. It is contemplated that a washing machine on this principle will be of utility. the purchase being in the upper rolls and worked by a handle of suitable length, it will be very easy indeed. the clothes being between the two swinging frames. and in the center of the vessel they cannot receive any injury. for the one first yielding to the other becomes a squeeze and a roll while one set of rolls turn upwards & the other downwards. The above are given merely for example, the machine and its parts may be varied as will be convenient

Witness { William Morgan, Henry H. Lister }

Ebenezer Lister (his Mark)

1167

PART OF PLAINTIFF'S EXHIBIT 33.

PLAINTIFF'S EXHIBIT 34.

817

United States of America, } ss:
EASTERN DISTRICT OF NEW YORK.

I, Percy B. B. Silkes, Clerk of the District Court of the United States of America for the Eastern District of New York, do hereby certify, that the Papers annexed to this Certificate are true copies of the Originals on file and remaining of record in my office in Equity Case #6888

In Testimony Whereof, I have caused the seal of the said Court to be hereunto affixed at the Borough of Brooklyn, in the Eastern District of New York, this 8th day of November, in the year of our Lord one thousand nine hundred and thirty-seven

Percy B. B. Silkes, Clerk.

Ivy S. K. Feuer
Deputy Clerk

1170 Opinion, Byers, D. J.

United States District Court,
Eastern District of New York.

The Maytag Company, Plaintiff,
No. 6888. vs. Equity.
Brooklyn Edison Company, Inc., Defendant.

July 17, 1935.

Appearances:

Wallace R. Lane, Esq., Oscar W. Jeffery, Esq., Clarence J. Loftus, Esq., John F. Ryan, Esq., Counsel for Plaintiff.

Pennie Davis, Marvin & Edmonds, Esqs., Solicitors for Defendant, by Dean S. Edmonds, Esq., George I. Haight Esq., Walter H. Free, Esq., Edgar F. Beaubien, Esq. of Counsel.

Byers D. J.:

This cause involves patent No. 1,866,779 issued to the plaintiff corporation July 12th, 1932, upon application filed by Howard F. Snyder, deceased, on June 14th, 1922. The plaintiff is the assignee of the applicant, and for convenience reference will be made to the grant as the Snyder patent. It has to do with a washing machine referred to as the Maytag.

1171 The defendant corporation is an inhabitant of this district, and is being sued in this court because it has heretofore sold three competing machines known as the Easy, the A B C and the Thor.

No jurisdictional or other questions not touching the merits are presented.

A comparison of the plaintiff's machine and those said to offend, as supplemented by the testimony, reveals unmistakably that there is no fundamental difference between them. The mechanisms, method of operation, and physical characteristics are in such close resemblance, that the issue of infringement presents no problems.

The one matter relied upon by the defendant, to avoid infringement, is the shape of the base of the impeller, or agent for agitating the water in which the washing is accomplished. That is not controlling, and will be discussed in connection with the claims.

The issue seriously made is as to validity, and that is presented in dual aspect, namely: that the machine does not function according to the specifications and claims; and if it does, the patent is void for lack of invention.

Understanding of the controversy requires that something be said of the course of events in this industry, since the plaintiff's machine was put on the market in 1922. By that time and as the result of efforts which had persisted for over ninety years, washing machines had come to occupy an important place in the domestic economy of the country. The courts have spoken of their contribution to the general good (Iowa Washington Machine Co. vs. Montgomery Ward & Co., 227 Fed. 1004, affd. 234 Fed., 88). The mitigation of the
rigors of a prosaic task, which was their purpose, has
1172 been a constant challenge to inventive skill, from 1809
when the first patent for such a machine was granted, until the present time.

The successive types have been known as the rub-board, the peg-dolly (having pegs, and later blades, to rotate or oscillate the fabrics against corrugations in tubs), the oscillating type (to tumble the fabrics against ribs or corrugations), the cylinder type having a like purpose, and the so-called vacuum-cup type to press the fabrics and squeeze them against the tub bottom. The two latter were making headway against the peg-dolly type, between 1915 and 1920, although the latter was probably in greatest distribution during those years.

The washing of fabrics requires that the deposit of foreign substances which find lodgment in the meshes, and in the interstices of the threads themselves, shall be overcome and the substances removed. Soapy hot water loosens the particles so engaged, but as these lack migratory properties, expulsion can be accomplished only by deforming the threads, and hence the fabrics. The testimony to this effect is uncontradicted.

That is the requirement to be met in devising a substitution for manually rubbing, squeezing, twisting and manipulating the fabrics, when in the soapy water, which precedes rinsing in clean water. It will be seen that the manipulation cannot be avoided, but if the means of accomplishing it can be mechanically applied, the energy required for manual application can be released for different and more congenial manifestation.

It is unnecessary to portray the operations of the various types of washing machines which preceded the Maytag in
point of time; the fact is that they consisted in so dis-
1173 posing mechanical agents in a closed container or wash
tub that the necessary deformation of the threads of the fabrics being washed was undertaken by subjecting the fabrics to contact with ribs or corrugations or similar obstacles contained in the tub itself.

In the peg-dolly type, which consisted originally of a disc having three or four projecting pegs (so that it looked like a small milking-stool) held in central position by a shaft, the clothes were engaged by the pegs, and the mass was rubbed back and forth by half rotation of the dolly, first in one, then in the reverse direction, and the clothes nearest the walls of the tub were rubbed against it and themselves. In this operation, the mass had frequently to be rearranged through the application of a washing stick. That meant that the cover had to be opened, as occasion required, and heavy wet articles lifted and rearranged.

The operation of the peg-dollies was rigorous, which meant heavy wear and tear.

In some models, the pegs were succeeded by blades which were not quite so deep as the length of the pegs, but they were substantial in construction, usually arranged radially, and in section they were usually triangular.

These blades performed the same office as the pegs; but admitted of somewhat automatic displacement and movement of the materials being washed, because they tended to slip over the blades instead of being rigidly held as by the pegs.

The diameter of the disc was usually less than that of the tub, but there seems to have been no constant relation of those respective dimensions.

The contra movements of the disc and its projections agitated the water, which gave rise to the necessity for keeping the top of the tub closed. This condition of turbulence
1174 being inevitable was accepted but not apparently recognized as a factor in the washing operation, except in the instances later to be noticed.

The asserted contribution of the Snyder patent was the departure from the understanding current in 1920 or thereabouts, that washing machine technique required for its success, a method of rubbing the clothes against projections within the tub, so as to duplicate the process involved in the manual use of a scrub board or wash board, when washing was accomplished entirely by hand, and substituting for that, a process of contorting the fabrics mainly by water action, so that the deformation of the threads and the consequent dislodgment and migration of foreign particles from the meshes and the threads themselves, would be accomplished, without subjecting the fabrics to the heavy wear and tear previously encountered.

Such is the teaching of the Snyder patent, stated in simple language, and the defendant has undertaken to prove that the machine does not function as the patent says it does.

The Maytag machine consists of a tub, in the bottom of which is a power-driven impeller called a gyrator, consisting of a disc substantially less in diameter than the tub, having a cone-shaped center, and upon the disc are mounted four radially disposed b[illegible]des. This impeller is oscillated at a speed not specified in the patent, so as to set in motion opposed currents of water which establish a flow outward from the bottom center of the tub, upwards at the sides to the surface of the water, and back to the center and down to the inner portion of the impeller blades. The fabrics being washed, if the mass is not too great, follow that course,
1175 turning over constantly. The water is hot and contains soap, and at the end of ten minutes more or less, the fabrics so treated, are cleansed.

The success of the operation is not questioned, but the controversy is as to how it is accomplished; the defendant contends that the impeller is in effect, the peg-dolly in a different form, and that the result is obtained in the Snyder machine, as it was in those of the earlier forms of construction, and that the patent tells one story and the machine acts another.

The Maytag device was put on the market in 1922, and substantial sales were made in that year; subsequent commercial success has rewarded the plaintiff so that down to the trial, some 2,000,000 machines had been sold, of which 172,000 were of the type illustrated in the patent, and the balance were of the high center post type later adopted. That element is conceded not to affect the issues here involved.

While comparatively little advertising was done down to 1925, the creation and maintenance of channels of distribution were naturally accompanied by increasing publicity, and large sums came to be expended in later years.

At the outset the dealers were skeptical concerning the claims of the plaintiff that the machine so operated as to wash clothes by water action. Competitors who were then selling the various types of machines above noted, did what was to be expected in fostering that skepticism. It is not contradicted that the plaintiff's machine was referred to in trade circles as an ensilage cutter, and was otherwise derided both by dealers and salesmen from competing manufacturers.

Contemporaneously, two of the latter, the A.B.C. Company, and the Easy Company, acquired Maytag machines for
1176 the information of their experimental staffs.

In about 1925 and 1926 competitor's machines appeared upon the market of the same type as the Maytag, that is, they had a bottom-positioned impeller, power driven, and of the same general appearance, and the same claims were made for them in pamphlets issued by the manufacturers, as were made by the Maytag Company, namely, that in these machines, washing was done by water action, with a resulting saving in time, and wear and tear upon the fabrics.

That condition has continued to prevail down to the time when this suit was started.

The assertions in all the advertising matter, and there is a substantial bulk of it in evidence, are flamboyant and unrestrained to the effect that the A.B.C., Easy and Thor washing machines, do their work by water action, etc. The importance of these representations lies in the fact that the manufacturer who made them may be thought to have intended to induce prospective purchasers to believe them to be true.

On these manufacturers' behalf, this defendant takes the position that all such assertions, both of the plaintiff and its competitors, are untrue. The defendant itself distributed some of these pamphlets but professes not to be embarrassed by that fact.

Of course, the legal issues are not to be controlled by sales patter, but when advocacy is confronted by advertising from its own camp, its objectives forfeit something of access.

It is asking much to suggest that the court should close its eyes to the repeated assertions of those who are not in the remote background of this contest, and which are directly at variance with the arguments now made by defendant's counsel.

1177 The foregoing is intended to portray a practical aspect of the controversy which has been waged in this court over the plaintiff's patent.

Sight has not been lost of the right of the competing manufacturers to copy the plaintiff's machine in all substantial aspects, and to compete with it on its own ground, if the plaintiff's device is simply the embodiment of teachings of an earlier day (than June 14, 1922), which were then at large.

Certain aspects of the case stand out clearly:

The Maytag machine has been commercially successful, and washes clothes satisfactorily.

The patent was pending for over ten years, during which there was one interference proceeding that went to the Court of Customs and Patent Appeals (Unruh vs. Snyder, 49 Fed. (2) 1038—decided June 1, 1931), and another was attempted without success. During these years there were many amendments to the specifications and claims.

It is the defendant's task to overcome the presumption of validity, which gains something from the unusual stress and strain of so searching a process as attended the final grant of letters.

It is necessary now to examine the Snyder patent at close range.

The specification recites the inventor's objects as being to provide a novel construction designed to wash and cleanse clothes, fabrics, and the like, including those of delicate texture which would suffer if subjected to the rigors of ordinary washing machines or even washing by hand. It is said "By reducing friction on the articles to be washed the life of the article is preserved."

In part the objects are attained by associating the tub and gyrator and by so operating the latter "that the weight
1178 of the articles does not interfere with the gyrator or its action, or with the tub and its co-action with the gyrator." The latter may be at the top or bottom of the tub, but has always been bottom-positioned in the Maytag machines.

The articles to be washed are suspended in the soapy water during the operation so that the alternating rotary movements of the impeller called gyrator do not interfere with the latter and so sustain damage while they and the water containing them are "turbulently swirled or whirled about with a surging or seething movement within the tub."

The drawing shows a bottom-positioned gyrator, and in that type of construction it is said that the impeller action on the water is to "constantly press the clothes upwardly in a swirling formation so that they are maintained in substantial suspension in the liquid above the blades."

The tub is smooth, i. e., without corrugations, etc., and as shown the bottom is inclined upwardly on both sides adjacent to the impeller "so associated" with it and with the rest of the tub "as to cooperate therewith in aid of such action."

One object of the invention is to provide the method of and apparatus for such cleansing without bringing the fabrics "into substantial rubbing contact" with the tub or the impeller.

Another object is to provide flanges or blades to the impeller to impart the characteristic movement to the water and clothes which has been described, while a rotary or gyratory movement thereof results from the alternating rotary action of the impeller, the water and clothes being driven around the tub first in one and then the other direction. The paths of
the water and clothes are called devious; the vigorous
1179 agitation of the water prevents the clothes from being injuriously affected by the "gyrator operating or actuating mechanism," which latter can be disconnected.

The new method of washing is described as being accomplished by the action of the water itself on the materials "as distinguished from their being rubbed or drawn through the water by a dolly or other mechanism, or tumbled against the sides of the tub or rubbed against projections on the interior of the tub."

The water is said to drive and swirl the clothes about the interior of a smooth tub avoiding "substantial contact" with the tub or gyrator; the water movement "largely prevents" rubbing the clothes against the tub or the impeller, whereby deterioration of the materials washed is eliminated.

The patentee says it is difficult to explain all the advantages because of the unusual water movement.

The gyrator is defined as an alternating rotary member operable to effect movement of fluids and materials from the central portion thereof to its outer edge.

Reference to the drawings is extensive and comprehensive. The patentee says that he shows a bottom positioned impeller, but also comprehends one depending from the top of the tub, whereby the characteristic flow heretofore described, would be reversed in direction (not referring to the circulatory currents however).

The gyrator is annular, dish shaped as shown, "the central or inner portion of which merges in a continuous concave curve into a central upstanding stem portion 53, which terminates in an upper rounded end. The outer peripheral edge
of the trough-like portion 54 extends outwardly and
1180 upwardly in a concave curve 55, which is continuous with the dished curve of the portion 54." The blades or flanges are vertical, and incline from their outer edges to

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the trough-like portion of the gyrator, extending half-way up and merging into the center stem. They are of "substantial height" so as to project well into the water of the tub. They are lobe shaped, extend considerably above the dish shaped member (disc) to provide sufficient blade surface "to impart a considerable force or throw to the water" outwardly and somewhat parallel to the axis of rotation of the gyrator.

The curve upward of the [dish] assists this water movement, which is also augmented by the inclined adjacent walls of the tub.

It may be convenient to pause sufficiently to observe that the assistance and augmentation so referred to, are not deemed essential features of the disclosure, by this court. The water movement is initiated by the blades, and is almost equally present according to the testimony, when the flat disc model is employed in a tub which does not contain walls which incline upwardly adjacent to the impeller.

So much of the specification as relates to the power and coupling is not presently material.

The recital continues that when the gyrator is alternately rotated (in practice about 225° in the extent of rotation) or oscillated, the water and materials are given the outward, upward, inward and downward movement previously stated. The materials being washed are said to be given "a quick, snappy, sieving, whirling, reversing double action, produced by the gyrator, doubling the clothes first one way and then the other until every thread in the fabric is acted upon
1181 an untold number of times, somewhat like the cracking of a whiplash in all directions." Again it is said that it is difficult to describe the action of the water and the clothes produced by the rapid reciprocation of the gyrator, whereby cleansing is accomplished while the materials "are held in suspension" by the peculiar and novel movement and action of the water. In spite of this the patentee thinks that anyone skilled in the art can readily construct and operate the invention and utilize the method disclosed.

The offending machines constitute a tribute to that prophecy, although it is now said that they are embodiments of earlier teachings.

The claims in suit are the following:

"23. A washing machine comprising in combination, a tub for containing cleansing liquid and materials to be cleansed, said tub having a bottom portion and an upwardly extending wall portion, the interior surface of which is free from rub-

bing projections, a rotary reciprocatory impeller mounted in the tub adjacent its bottom, having a base and a plurality of blades, each of which is of substantial height and lateral area, and a central portion projecting upwardly from the base, the upper surface area of the base being considerably less than the horizontal cross-sectional area of the tub through its upwardly extending portion, the margin of said base being spaced a substantial distance away from the upwardly extending portion of the tub, said tub and impeller being so constructed and positioned relative to each other that when the impeller is rapidly reciprocated each blade and its adjacent portion of the impeller base will simultaneously drive the cleansing fluid in one and then an opposite outward upward circulatory direction toward and around the clothes, and act in cooperation with the interior of the tub to cause violently flowing opposed currents of liquid to meet and flow inwardly and downwardly toward the central portion of the tub, and substantially suspend the materials in the fluid while being washed, a rotary reciprocating drive shaft extending upwardly through the bottom of the tub into the interior thereof for supporting the impeller for movement in a fixed plane, and power means for rapidly reciprocating the shaft and impeller for the purposes set forth."

1182

"26. In a washing machine for cleansing fabrics by forcing cleansing fluid through them while substantially suspended by the action of the fluid, as distinguished from pulling or pushing the fabrics through the fluid or against scrubbing forces, or otherwise scrubbing them by mechanical means, a tub, a substantially imperforate rotary reciprocatory impeller mounted to operate in a fixed plane having blades of substantial height and area projecting therefrom in a direction toward the fabrics while they are being cleansed, said tub and impeller being so constructed and arranged as to cooperate while the impeller is in operation for whipping the fluid and violently forcing it outwardly, upwardly and in a general vertical and circulatory movement and circumferentially of the tub first in one and then in an opposite direction and through and around the materials, and substantially suspending the materials in the fluid while being washed, and power means for rapidly reciprocating the impeller."

"38. The method of washing fabrics by forcing cleansing liquid through and around them while substantially suspended by the action of the fluid, as distinguished from pulling fabrics through the fluid against scrubbing corrugations, or otherwise scrubbing them by mechanical means, comprising immersing the fabrics in a washing fluid

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in a container, then vigorously and rapidly impelling the washing fluid in one and then in an opposite outward circulatory direction away from the plane of the source of impulsion and through the fabrics and circumferentially along the interior of the container in rapid succession, and causing these violently opposed currents of fluid to meet and flow inwardly and toward the central portion of the container, and toward the source of impulsion thereby substantially suspending the fabrics in the fluid and cleansing them while thus suspended."

The principal assault upon this patent as has been stated is, that the Maytag machine does not function in accordance with the recitals, or the claims; that the materials are not held in suspension near or over the blades, but are actually battered by them, and are dragged back and forth in the water, precisely as was done by the peg dolly type of washer; and that the required squeezing, release of pressure and rubbing are administered by blows struck by the impeller. That in effect the same things are done to the fabrics by the impact of the impeller blades, as was first done by hand in remote times, and latterly by the machines prior to the Maytag.

It is not easy to observe how any of these machines really does function. Demonstrations in the court room in glass tubs, so illuminated as to reveal all that the eye can perceive, yielded little which can be stated precisely.

In clear water, tracer cloths alone, is few in number, showed that the course of flow described in the patent does take
1184 place, and that in addition there is a constant turning called roll-over of the tracer; the whip-lash was not always easy to see, but there was a flexing and doubling back of the fabric as it moved in and around the tub.

When numerous articles were added, the movements were more difficult to follow.

As to the tracer, it worked out, up, back to the center and down to the region of the impeller blades, and while there received an impulse that made it continue the journey; whether it was actually struck by the blade, or was caused to move by the motion imparted to the water by the blade, was too close a thing for concincing observation.

On this subject it must be stated, that to liken the effect of the impeller blade upon adjacent fabrics, to the pounding of clothes upon a rock practiced in primitive days, is to fail entirely to distinguish between an under-water thrust and a blow delivered out of water. The force of the motion of the impeller blades is largely expended in moving the water in

which the impeller is immersed, and while there is seemingly an observable contact between the fabrics and the impeller when even a normal or capacity load of materials is treated, the actual striking energy of the blade is obviously inconsiderable. No effort whatever was made by the defendant to cause it to be stated in terms of force or power, nor is it apparent how that could have been contrived.

That there was dragging, i. e., temporary engagement by blades with elements in such a load as the Maytag machine was designed to handle, is true, but it was not continuous, and did not impede the roll-over movements of the materials in the course described.

1185 To say that the clothes were suspended, that is, maintained horizontally or otherwise out of any contact with the impeller, would be untrue. The articles did turn over and flex back and forth, and did flutter as the experts have it, and there was no perceptible rubbing against as distinguished from movement along, the smooth interior of the tub. The fabrics did not move outward above the blades, but from down between them.

The defendant objects to the limitation expressed by the patentee in saying that there is no substantial contact with the impeller, and that the clothes are cleansed while they are substantially suspended; and yet after carefully observing the operations of the Maytag and the challenged machines, one would be hard put to devise apt words to portray an impression which at best is incapable of statement in exact terms.

Tests were made to demonstrate that if fabrics were kept out of contact with the impeller, they were not cleansed. That is true, but the preventive agency in each case also rendered impossible the necessary contortions of the fabrics which may well contrive the deformation of the threads requisite to the eviction of the foreign particles from their interstitial lodgings; once dislodged, they can be borne away by the force of the contending currents set in motion by the impeller.

The presence of lint in the water after a period of operation was clearly shown, but that is not incompatible with a cleansing process such as the claims describe. Perhaps it goes beyond the promise of a washing operation which "eliminates the deterioration of materials being washed by it" as the recital proclaims, but that pertains to the result, not to the thing which is done.

1186 In the absence of a comparison of the percentage of lint found in the water of a Maytag machine, and a

like result following the washing of the same materials in a peg dolly machine, it cannot be concluded that identical traumatic incidents characterize the two operations.

The defendant is satisfied that it is impossible to wash fabrics in the Maytag or the other machines according to the teachings of the patent, and that therefore such washing does not take place.

The court is not satisfied that this negative has been proven. It inclines perceptibly to the view that the Maytag machine washes fabrics, when not overloaded, perhaps not with mathematical fidelity to the tuition of the patent, but with sufficiently close adherence thereto, to justify the conclusion that the water action created in the machine of the patent plays a far more important part in the final result, than in machines which it superseded and which depended upon rubbing the materials against corrugations and ribs of the tub through the agitation of the peg-dolly. The impression persists that Snyder's was a new step, an advance beyond the latter machines, in that the water action became the major factor in the operation, and so functioned as to distort and manipulate the fabrics and thereby to cause deformation of the threads and if this was aided by such contact with the impeller as does take place (Snyder did not teach its absence) the latter is the subordinate and not the dominant phase of the accomplishment. Certainly there is no such thrusting of the fabrics against the tub, as it was the office of the peg dolly or the bladed dolly to accomplish.

1187 Before leaving this aspect of the discussion it is proper to add that fabrics are not cleaned by flowing water over them, nor by forcing it between the meshes. Experiments to that end do not aid in reaching a conclusion. The deformation of the threads is essential and when the patentee stated that his machine so operated that "every thread in the fabric is acted upon" he demonstrated a knowledge of the essential nature of the problem he had undertaken to solve.

When he said that he caused the several threads to be acted upon as the result of the interplay of the opposed currents of water upon the fabrics, which were set in motion by the impeller as he described, he made a statement which has not been disproved by the evidence in this case.

Passing now to the other aspect of the defendant's major assault upon the patent, namely, that it lacks invention, it becomes necessary to consider the constituency of the art as revealed in June of 1922.

The customary deference thereto commonly proclaimed under comparable conditions, need not obscure the fact that none of the accused machines measurably approaches any of those described in the patents relied upon by defendant.

Hermance #88,478 (1869). This is a wash-boiler, having a perforated wheel at the bottom, of almost the diameter of the container. On the wheel are several hollow U-shaped radial ribs, open at their outer ends. The clothes are laid upon the wheel, and the latter is reciprocated from above the cover in half circles, by a handle connected with a center shaft. The patentee says the suds are tremendously agitated, the water passing through the tubes or ribs centrifugally, and then it rushes in again through the
1188 outer ends and perforations."

The defendant operated by hand a machine which it bought from a user, and asserts that the characteristic course of flow was so produced. If so, the court could not observe it.

The defendant's witness who owned the machine said the inside, by which was meant the wheel, had not been used for thirty years. That the tub was used to boil clothes in. Also that the clothes were rubbed by the dasher against the tub, which was later modified by her statement that she could not see what took place when the tub cover was on.

The abandonment of the agitator, in favor of boiling clothes with the help of washing powders, is practical evidence that the machine did not give continuous service according to its patent. The latter did not teach thread deformation as the result of a contortion of the fabrics through the interplay of effective water currents. There is nothing in the patent to indicate that Hermance regarded this as a desirable accomplishment. Hermance did not anticipate Snyder.

Morse, #106,853 (1870). This patent apparently discloses a machine intended to wash clothes by water action, for the tub contains no ribs or corrugations. There is a bottom positioned dasher somewhat smaller in diameter than the tub. The disc supports a series of four prismatic arms disposed so that each projects to the rim, as shown in Fig. 1. The height of these arms is not stated. A center structure supports a circular series of round bars rising to a disc near the top cross bar. The dasher is reciprocated by two hand-operated handles at the top.

The patent states, referring to the risers, "Their purpose is to aid in washing the clothes, and imparting to them
1189 reciprocating rotary motions within the tub G, within which the dasher is arranged, and to which it is piv-

oted, so as to be capable of being moved there in with a [riciprocating] rotary movement by a person" holding the handles.

The arms are said to aid in preventing the clothes from moving toward and piling about the shaft, as the centrifugal force "generated in the water and tending to throw it upward at the sides of the tub, will be met and counteracted by lateral currents or forces induced in the water by the arms."

The improvement claimed is the disc and the series of bags arranged with mutual reference, and with the shaft to which the handles are fixed.

The defendant's expert says that this machine operates by pounding, rubbing and dragging of the clothes by the disc.

The disclosure of this patent is a triumph of reticence. If the patentee had discovered anything he was careful to conceal it. He merely built a structure, described its essential elements and their respective relative positions, and said that the arms would function as quoted above.

The operation of a reproduction of this machine by hand power in court was said to result in [prodlcing] the turnover of clothes and the characteristic course of flow found in the Maytag and accused machines. Perhaps it did, but the patentee taught nothing of the kind.

There is no reason for believing that he suspected the necessity for thread deformation, nor is there any proof that clothes were successfully washed in his machine as he built and described it.

The best that can be said for Morse is that he believed in the efficacy of water action for cleansing clothes; it has not been demonstrated that he taught how to accomplish
1190 it. To declare Snyder invalid on Morse's disclosure could be justified only by attributing to the latter many things which do not appear in the patent.

Foster & Garrison, #832,787 (1906). This is an attempt to provide a washing machine in which the fabrics are cleansed by water action, that is, the rebound of water from the sides of a cylindrical shaped tub, which sides constitute an independent unit or shell; the latter is so constructed as to present a circle of triangles the alternate apexes touching the interior of the tub. The water action is created by a bottom positioned impeller, having no supporting disc, and the oscillation or rotation thereof causes the water to move outward toward the triangular surfaces, from which "said water is reacted against and through the clothes."

The defendant argues that this action is impossible, but that for present purposes the patent must be construed as though it were.

How a concededly false premise can lead to any helpful conclusion is not demonstrated.

It has been said above that the mere forcing of water through meshes, does not accomplish the necessary thread deformation, and probably further comment on this patent is unnecessary.

In contrast to the Maytag machine, the Foster and Garrison device is not shown to have washed clothes, either in accordance with the statements in the specifications or otherwise. Whatever else this patent may be, it is not an anticipation of Snyder.

Davis, #1,244,826 (1917). This machine contains an oscillating, disc-shaped agitator, of wood, to float on top of the fabrics being washed. Disposed radially upon the
1191 under side of the disc are eight ribs or vanes extending from the rim toward the center; six are shorter than the other two, all are beveled at their inner ends, and the center of the disc is unoccupied. The objects to be attained were the creation of a water flow, generally opposite to that of Snyder (in the position shown in the drawing) by the action of the ribs, while the latter also "rub lightly upon the fabrics without injuring them."

The water is said to "force its way through the fabrics" creating the described circulation. "Thus the fabrics will be thoroughly cleaned without being pulled and distorted, the circulation of water through the fabrics resulting in the removal of dirt therefrom. In addition to the foregoing the ribs will act as rubbing elements inasmuch as they will engage lightly with the fabrics thereunder."

The claim is for the combination with a tub of the described disc, adapted to create the flow as stated, and a driving shaft, the disc being movable vertically. Davis taught washing by a combination of rubbing lightly the fabrics, by the ribs, with water flow which would contribute to the desired result. It is not easy to visualize the action of the Davis machine as other than an engagement of the fabrics by a top-positioned set of blades, and an indefinite kind of change in the mass of fabrics caused by the agitation of the water, but the proportionate contribution of the

latter, to the actual cleansing is not clear from anything that the inventor says. Thread deformation through water action is not even suggested.

The Davis patent was not thought to anticipate by the Patent Office, and that view is shared by this court.

1192 Doughty and Davis, #1,496,305 (filed April 8, 1922).

This is a machine having a bottom-positioned agitator, of a diameter slightly less than that of the tub. Triangular vanes or ribs are arranged radially from the center, extending almost to the rim of the agitator. The height is not given. The invention claimed was that of having these vanes spaced unsymmetrically, i.e., there is a greater distance between two of them than betwen the others which are spaced equally apart. The object of this was to create an inequality of currents set up by the oscillation of the agitator, for the purpose of preventing clothes which were being washed, from adhering to the top of the agitator. The patent says that a marked tendency was present if the vanes were equally spaced, "for a single one of the many pieces * * * in the tub to cling to the agitator, an action which interferes seriously with the efficiency of the machine in washing." The three claims are specific on this point.

If the device did not work with equally spaced vanes, it is hard to see how Snyder was anticipated, for his device does so operate; if unsymmetrical arrangement of the vanes had to be resorted to, the difficulty to be overcome must have been peculiar to the Doughty machine, but its elimination, if accomplished, did not result in teaching what Snyder taught.

Freeing the materials being washed, is not the same as deforming the threads through the rapid and vigorous currents set up in the Maytag machine.

Defendant's expert says that the washing effect under this patent is produced by squeezing and dragging and that the rubbing effect is greater than in the Maytag.

1193 The defendant's argument is again, that this patent must be regarded as anticipatory of Snyder, because it professes something which it does not accomplish. The argument contains its own answer.

British patent to Jardine, #18,202 (1891).

Clearly this patent as such, has no bearing on this controversy, for it relates to a device for preventing materials being washed, from slipping under the bottom of a disc, having

blades, and capable of being either rotated or oscillated, and placed in the bottom of a tub. There are ribs on the tub, and defendant's expert says that the clothes are rubbed against them if the disc is rotated, but not if it is oscillated. It is pointed to by the defendant as indicating that such an impeller as Snyder contrived, was known in Great Britain over 40 years ago. Perhaps it was, and perhaps the Jardine device was sold in commerce, and perhaps when coupled to a motor it can be made to oscillate, and create the appearance of functioning as to any of the machines now being examined.

The patent, however, is quite silent upon the whole subject, and the manufacturers of the challenged machines did not adapt the machine of the Jardine patent to their own purposes.

One can read the Jardine patent closely and often and yet not find any teaching whatever of a device to perform the operation of washing according to what Snyder says he invented. Jardine's instruction was of a means to prevent the mangling of fabrics beneath the disc. The presence of the ribs in the tub, and the necessary squeezing of fabrics against them by the blades of the agitator, is too
1194 clearly indicated by this patentee to admit of misunderstanding.

French patent, Henin #363,514.

This is a patent for a washing machine consisting of a tub having corrugations, a bottom positioned agitator built of cross-members (slats) so constructed according to the drawing, that there is ample spacing between the slats; the agitator is pierced from below by a hollow tube containing a shaft which oscillates the agitator, manually or mechanically.

The agitator is circular, its diameter being only sufficiently less than that of the tub to permit of clearance. The agitator carries vanes and ribs radially arranged which do not extend laterally to the periphery, and these ribs and vanes, or perhaps only those which extend vertically, contain three apertures, and the office of the agitator is thus described in paragraph 4 of the "Resume."

"4. An interior disc comprising crossed wooded slats, in combination with wings and ribs, for the purpose of preventing the batch of linen from becoming packed at the bottom of the tub."

None of the other paragraphs discusses the washing, or the means whereby cleansing is accomplished.

The Henin machine is more like the four structures which are the subject of this cause, than anything else shown in the art as it was known in 1922.

How far it may be said that the disclosure in a foreign patent must be clearer if anything than that in an American patent to establish anticipation is perhaps somewhat
1195 in doubt in this circuit—See Trussell Mfg. Co. vs. Wilson-Jones Co., 50 Fed. (2) 1027 at 1029, where it is said:

"This disclosure is not sufficiently clear to satisfy the rule already mentioned. Indeed, it has been urged that that rule must be applied more strictly to foreign than to domestic patents. Much may be found in the books which seems to support such a distinction. See Seymour vs. Osborne, 11 Wall. 516, 555, 20 L. Ed. 33; Hanifen vs. E. H. Godshalk Co., 84 F. 649, 651 (C. C. A. 3); In re Ek, 57 App. D. C. 203, 19 F. (2d) 677, 678. However, we see little basis for it. An inventor is charged with knowledge of whatever the prior art discloses, but the disclosure, to be an anticipation, must be clear and certain. Why it need be more clear in a foreign patent than domestic one, we confess is not obvious to us. But we need not now determine whether the distinction is too firmly established to be disregarded. We mention it merely by way of a caveat."

Within the language quoted, it is thought that Henin fails entirely to disclose a mental concept that may be fairly held to have been prior to Snyder; he was describing an agitator to function in a corrugated tub, which suggests the rubbing of clothes against the corrugations to produce thread deformation. He provided means, not to promote that deformation through the action and counter action of opposed currents of water, but a perforated disc upon which the fabrics would not mat, but he does not disclose why or how that result is produced.

There is nothing in the recital consistent with a purpose to produce cleansing effects save by the battering of fabrics against the corrugated walls of the tub, and in the absence of a statement by the patentee that he contemplates
1196 something other than that, it is believed that Snyder is entitled to be judged on the merits of his own disclosure, so far as Henin is concerned.

Nor is it the Henin model which the accused machines embody.

French patent, Versaille, #398,798 (1909).

This machine involves a tub having non-corrugated sides, and an agitator shaped like a spool, which rotates in alternate directions. Between the upper and lower plates of the agitator, which is as high as the tub is deep, "are radially mounted a series of blades adapted to whip constantly the articles to be washed by projecting them against the side walls of the tub". Later it is said: "In turning, the agitator blades drive the articles to be washed laterally into frictional engagement with the tub wall, from which they rebound toward the agitator. In that way a continuous friction is production which results in a perfect washing action, with the expenditure of a minimum of physical exertion."

In paragraph 3 of the summary, in referring to this action it is said that the articles "are acted upon between the agitator and the tub."

Enough has been quoted, it is supposed, to indicate that this patentee's conception was almost precisely unlike that of Snyder.

Whether the machine could be manipulated so as to produce in the lower half of the tub, a water flow comparable to that of the Maytag machine, scarcely touches the issue of anticipation. Versaille depended upon thrusting the fabrics against the sides of the tub, as he said repeatedly. He taught nothing of thread deformation through water action.

1197 This machine also was available to the manufacturers of the accused devices, when they put out their underwater impeller type machines, but without perceptible effect thereon.

Miller, #738,560 (1903).

The defendant offered in evidence two machines built by Miller, apparently between 1915 and 1920. The plaintiff offered the patent in rebuttal. The latter teaches an overhead floating dolly which co-operates with the ribs on the side and bottom of the tub. The specification says, "The rubbing is effected by the action of the side and bottom ribs of the agitator in conjunction with the side and bottom ribs of the tub, and this rubbing in connection with the rush of the water as the agitator is turned within the tub and the squeezing action effected by the up and down movement of the agitator is designed to cleanse the articles in the tub in a satisfactory manner."

The agitator ribs are comparatively large in order to better serve their purpose in moving the water and the clothes. The claims are appropriate to the disclosure.

The late abandonment by Miller of ribs in the tub, as shown in Defendant's Exhibit 22, was thought not to affect washing results. This departure perhaps brought the Miller machines into similarity with the teachings of Davis Patent No. 1,240,826, but that would not establish anticipation of Snyder.

Mills, #1,118,210 (1914).

This is a patent relating to gearing in washing machines. On that subject it is quite specific. A bladed agitator
1198 is shown in bottom position of the tub, and the only reference thereto in the specifications describes their construction. The claims assert nothing concerning the agitator, or what it accomplishes. Defendant's witness Geldhof, the practical designer of the Easy Company, said that such an agitator was harmful in its operations with respect to fabrics being washed, and that he would avoid such a device at all hazards. Certainly Mills revealed nothing in advance of Snyder, except perhaps a warning of something to avoid.

Covel, #95,565 (1869).

This patent is of interest largely because the inventor visualized washing by water action alone, although he provided vertical ribs for his cylindrical shaped tub. The agitator is at the bottom, and is rotated manually from the top, by a shaft runing through a sleeve maintaining it in a fixed position "thus preventing the tendency of the clothing to follow the current of the water, and to become wound around the shaft during its revolution".

The agitator has beveled radial blades, to generate upward movement of the water, and attached to them, or the upper side of the disc, horizontal thimbles or funnels to form horizontal currents.

The defendant's expert, Prof. Taggart, attributes to the patentee the conception of suspending the fabrics, but Covel does not say so. The witness gives it as his opinion that washing was done by pounding, scrubbing and dragging, from which it is fair to deduce that the ribs of the tubs served the office of opposing the fabrics, rather than the water currents.

1199 No one asserts that Covel's machine has been operated, so that it is impossible to tell whether clothes could be washed in it.

The most that can be said for it is that this inventor had the same end in view, as did Snyder, and the defendant asserts that he did not succeed, and that therefore Snyder must be assumed also to have failed.

Covel did anticipate Snyder in his ambition, but nothing that he teaches concerning his solution of the problem, constitutes tuition which Snyder is shown to have embraced.

Ritz, #1,393,969 (1921).

This patent discloses a discless agitator having three radial blades equally spaced, and intermediate triangular members. It is shown at the bottom of a corrugated tub, and oscillates on a vertical shaft the movement of which is demonstrated. As the agitator oscillates about 180° "the clothes rub against the corrugated side of the tub, and the agitator is free to follow the path of least resistance and to move up and down its sleeve 20 thereby overcoming the wear and tear frequently experienced in machines of this type".

The claims are concerned with the agitator only, the office which it performs being stated as quoted from the specification.

The distinction between this patent and Snyder is too clear to require discussion.

Groat, #113,762 (1871).

This patent covers the form of bottom-positioned agitator or impeller, manually oscillated, which the inventor believed capable of functioning so as to cause water to dash
1200 up from below the disc containing the ribs, through openings therein provided for that purpose. Such upward impelled jets or currents were struck by the ribs and dashed against and through the fabrics, and "at the same time the ribs D will operate to rub and turn the articles and agitate the water violently above the wheel".

The upward thrust of the water was said to be caused by a web construction beneath the agitator.

The patentee uses the term "beater" as synonymous with "ribs".

This is another example of an earlier effort than Snyder's, to construct a water-action washer. There is no testimony as to the success or lack of it, which attended the effort.

Once the distinction is grasped, between intention and accomplishment, as revealed in these several patents, it becomes

apparent that the presence of the former, does not establish anticipation of the latter.

Perhaps all the patents which have been discussed could have been disposed of by that remark, but they have been referred to herein perhaps at tedious length, so that it may be known that the defendant's contentions in respect of them, have undergone examination.

The other patents referred to fall within the general category of unsuccessful efforts to accomplish the cleansing of fabrics mainly by water action. However impressive the list of failures may be, taken in the aggregate, it does not follow that Snyder's patent is for that reason to be relegated to the limbo of futility.

In 1922 the art contained under-water impellers having blades, and the means to agitate them; smooth and corrugated tubs, and several announcements that these ele-
1201 ments could be associated and operated so as to wash clothes by water action. What it did not contain was a machine that accomplished that purpose.

It is next asserted that the specifications of the Snyder patent are not sufficiently "full, clear, concise and exact" within statutory requirements (R. S. 4888, Tit. 35, U. S. C. Sec. 33) to achieve validity.

The alleged obscurity has not proven an insurmountable obstacle to the manufacturers of the machines sold by the defendant.

Those manufacturers are of course members of the public who are entitled to be informed of the dimensions of the invention.

Truly the criticized expressions are not precise, such as the reference to the blades as having substantial height and area; and the spacing of the impeller as substantially distant from the walls of the tub; and the impeller's requirement of rapid reciprocation, in order that water may be forced violently outward and the like. It must be remembered that the operation being described is not easily to be followed in the visual sense, and hence does not lend itself to precise portrayal. This case with its mass of testimony and exhibits, presents an impressive array of controversy concerning what actually takes place within the machine during operations, and it is thought that the specifications must be viewed with tolerance in the light of that circumstance.

The importance of the relation, for instance, between the respective diameters of the impeller and the tub, is a matter of dispute within the defendant's camp; the evidence for the plaintiff is harmonious on that issue, perhaps because but one witness testified on the subject.

1202 The drawings forming a part of the application have not been criticized, and when read with the recitals it cannot be said that the patentee failed to lay bare his concept, and the way in which he embodied it, with sufficient definition to apprise the public and those possessing the conventionally denominated skill, of the metes and bounds of the invention.

A claim comparable to 26 and 38 here involved, was before the Court in Smith vs. Snow, 294 U. S. p. 1, in which the patent was held valid and infringed.

The defendant's expert defined "substantial suspension" occurring in Claim 26 and elsewhere as meaning "that the material is in water and not making any contact with the agitator that will result in deformation of the threads and cleansing by reason of such deformation".

That definition may be accepted. It accords with what the court thinks it observed, namely, that the contacts between the fabrics and the impeller were not of sufficient force to batter the fabrics so as to cause thread deformation.

The defendant has failed to demonstrate, however, that thread deformation does not occur as an incident to the torsional stress to which the fabrics are subjected while encountering the various water currents set in motion by the impeller, and while the fabrics are thereby thrust against and rubbed upon each other.

That the expression "substantial contacts" and "substantial suspension" thus have a clear meaning to one skilled in the art, follows from the fact that the defendant's expert furnished the definition, which seems to meet the reasonable requirements of the statute with reference to this patent.

1203 Before leaving this argument it may be said that it is thought that there is no requirement for specifying the load of clothes that could be conveniently handled in the plaintiff's machine.

Idiosyncrasies of individual technique, raiment, water (with respect to hardness), the degree of soil and its character, and the size and texture of the articles to be cleansed,

all have a place in such a matter. Overloading is a mere matter of experience and observation.

The speed of oscillation could scarcely be more important in the Snyder patent than the velocity of the air current in the Smith incubator-supra; so long as the patentee asserted the requirement of sufficient speed to accomplish the definite object stated, it is thought he has made the kind of disclosure that the law requires.

There is a considerable volume of testimony, and much argument in the briefs, concerning actual priority of invention, asuming that such is present in the case, as between Alpheus W. Altorfer of Altorfer Bros., now the A. B. C., and Snyder.

That question was imported into the case shortly before hearing, by the decision of an interference proceeding between Altorfer and Haag reported in 74 Fed. (2) 129 under date of December 24, 1934.

Altorfer's patent covers a washing machine comprised of a tub, the bottom of which is pierced by a vertical shaft drive, to which is affixed an under-water agitator comprising a disc the rim being spaced "a substantial distance from the wall of the tub," (an expression to which the defendant does not except for lack of exactness), a sleeve projecting up from the disc to a drive shaft with which it is connected.

Altorfer filed May 21, 1925, and Haag had done so on July
25, 1924. An interference was declared, and the final
1204 decision was in Altorfer's favor, on the theory that he
preceded Haag. Thus:

"We are of the opinion that the record shows that Altorfer had fully reduced his invention to practice by the spring of 1921, or in any event had done so before Haag had entered the field, and that the record does not disclose facts which indicate that Altorfer abandoned his invention, or that he ever supressed or concealed the same in such a way as to make applicable the doctrine in the case of Mason vs. Hepburn, supra. Altorfer's long delay in filing his application after the reduction to practice and his acts subsequent to his reduction to practice do not indicate any intention to abandon the invention, but, on the contrary, his subsequent acts indicated an intention to utilize and commercialize the invention at a date dependent upon the result of tests and upon other considerations which we think were wholly reasonable and proper under the circumstances for him to take into consideration."

The defendant cites this decision as establishing Altorfer's invention date as four years earlier than his filing, and argues that Snyder is thus anticipated.

The case is an adjudication as between the parties only, and for the purpose of establishing priority as between them. It was not necessary for the court to award Altorfer any date prior to August of 1923, for the record apparently showed conception by Haag in September of that year.

As between these parties, the decision quoted, although commanding the greatest respect, is deemed not to be controlling as to what Altorfer says he did in 1921. The testimony at bar has been carefully considered, and yields
1205 the distinct impression that in 1923 when the Altorfer Company acquired a Maytag machine, for the information of its enginering and designing department, Mr. Altorfer was reminded that he had conducted some experiments at an earlier date, which might be turned to good account.

It was in 1923 that he requested the witness Schellenberg (his employee) to fix the date of making the agitator, Exhibit 33, which he did by writing "February 1921" thereon, showing that in 1923 the former was concerned to establish a date respecting which there were then said to be in existence certain drawings which have since been mislaid or lost.

The absence of shop records cannot be lightly brushed aside. Altorfer was an experienced patentee; in 1921 he had filed 21 applications touching washing machines, dating as far back as 1909.

It is difficult to conclude that in 1921 he did not understand the necessity for making and keeping shop records and notes in order to establish through them, such important matters as the dates of conception and reduction to practice.

It is not necessary to explore the subject thoroughly, however, for two reasons: First, it clearly appears that while the Snyder application was pending, Altorfer sought to set up an interference based upon his own 1925 application, and was unsuccessful, because the Patent Office held that neither of the two agitators Defendant's Exhibits 28 or 33, embodied the Snyder disclosure, when used in the corrugated tub in which they were placed when Altorfer said he made his invention.

Second: Because Altorfer said when testifying in this case, that he had made a study of washing machines for 20

years and had yet to find a method of washing clothes
1206 that "did not embody the mechanical rubbing or flexing of the agitating means (namely, the impeller or agitator) on the clothes"—that the water movements do not have a material washing action on the clothes—there is not enough power generated to cause much washing action.

He repeated this in substance with specific reference to Defendant's Exhibit 33, and its rubbing of clothes against the corrugations of the tub. This testimony had to do with his own machine and if he believed it, he thereby confirmed the Patent Office view above recited.

As a matter of reason, the Altorfer asserted invention cannot be thought to anticipate Snyder, if the former says that his application does not purport to describe a washing machine which operates in the way that Snyder claims for his structure, and it is therefore unnecessary to attempt to fix a date for Altorfer's conception. If it were, the evidence would be deemed insufficient to show more than desultory experimenting prior to the acquisition by Altorfer Brothers, of the Maytag machine in 1923.

If it were essential to fix the date of Snyder's disclosure of his invention, the testimony of Mr. Mason would be relied upon as to January 21, 1921. The reduction to practice preceded that by a matter of months. It is not deemed necessary to fix the date, because the evidence fails to establish anticipation, but the subject is referred to because much is made of the undisputed facts that the Snyder impeller in its early form, was operated in a corrugated tub, while the new device was being tested.

This was not a matter of choice. The only tub available during 1919 and 1920 was of the corrugated type, since that
kind of tub was being manufactured and sold by the
1207 Maytag Company. That tub was not satisfactory in Snyder's opinion, to render his purposes effective, and this explains his change to the smooth walled tub. The narrative is consistent with the development of concept recited in the specifications, page 1, line 62, page 2, line 29, and in certain of the claims.

The defendant argues that the claims in suit should be limited to the dish-shaped disc, clearly shown in the drawings, Figs. 4 and 5, of the Snyder patent, and described at page 3, line 55 and 94, as follows:

"The gyrator is metal, or other suitable material and is of generally circular form when viewed in plan. It comprises an annular, trough-like or dish-shaped portion 54, the central or inner portion of which merges in a continuous concave

curve into a central upstanding stem portion 53 which tapers upwardly and terminates in an upper rounded end. The outer peripheral edge of the trough-like portion 54 extends outwardly and upwardly in a concave curve 55 which is continuous with the dished curve of the portion 54. The gyrator is provided with liquid impelling means, one form and arrangement of which is illustrated in the drawings. * * *

"As shown in Fig. 4, the blades extend across the dish-shaped member at the lower ends in lobe-shaped form and the upper surfaces of the wings or blades extend considerably above the dish-shaped member to provide sufficient blade surface to impart a considerable force or throw to the water in the direction outwardly and somewhat parallel to the axis of rotation of the gyrator, as hereinbefore described. 1208 It is to be noted that the outer inclined portion 55 of the dish-shaped member assists in this movement and that this directional flow is augmented by the inclined walls 48 of the surrounding trough or tub. The force imparted to the water is sufficient to cause the water to flow upwardly toward the top of the tub, as shown in dotted lines, Fig. 1."

The claims are preceded by the customary paragraph reserving the right to depart from the specific description of structure, etc.

From what has been quoted above it appears that Snyder taught sufficient blade surface to impart outward force or throw of water and that this was assisted by the dish shaped disc. Many claims not in suit specify that form of disc. Claim 23 does not, in terms or by implication. The reference to the "adjacent portion of the impeller base" means the inner portion as well as that near the rim.

The same is true of Claim 26.

In other words, these claims are in harmony with the invention as described in the specification, and the disclosure of the latter was sufficiently broad to support a claim which did not embrace a dish shaped disc exclusively, but a flat disc was equally within the conception as stated.

Claim 38 is assailed in that it is said to express only the function of the Maytag machine, and to be invalid as a method claim for that reason. The criticism is not without reason, for the flow of water and the opposing currents elsewhere are said to be created in the Maytag machine. The issue is close and may well develop a conflict of opinion.

To this court it seems that the method described involved thread deformation as forecast in the specifications, page 5,

line 25, and that such accomplishment by the pressure
1209 and interplay of contending currents was something not taught by Snyder's predecessors in this field. The substantial suspension of course was not a suspension at rest, but a movement which did not involve the kind of forceful contact with either impeller or tub which would effect thread deformation.

If that is true, the method is novel. If it can be accomplished in any other machine than the Maytag, then in the language of Waxham vs. Smith, 294 U. S. 20 at 22, "A method, which may be patented irrespective of the particular form of the mechanism which may be availed of for carrying it into operation, is not to be rejected as "functional," merely because the specifications show a machine capable of using it (citing cases)."

There is no testimony to the effect that the method as stated in this claim could not be practiced in a machine of another design, which is not a cause for wonder since defendant's main position is that it cannot be done in any machine.

Lacking such proof, the claim will not be held invalid.

The Snyder patent was pending from June 14, 1922, until July 12, 1932, and the file-wrapper is a formidable document in volume and content. Defendant criticises the claims in suit as having been proposed March 31st, 1932, two years after the Easy machine, and four years after those of the A B C Company were on the market and relies upon several decisions in this circuit to defeat these claims for laches and on the grounds of estoppel, citing cases; these have been examined.

It must be made to appear that these claims introduced new matter and broadened the invention as stated, in order that the said decisions may be invoked by the defendant.

1210 As to Claim 38, the method, it appears that this point was considered in the interference proceedings of Unruh vs. Snyder, etc., 49 Fed. (2) 1038, which went to the Court of Customs and Patent Appeals, and measurably delayed the issuance of the Snyder patent. It there appeared that Snyder's method claim was filed in July 1924, more than two years after the application.

That was Claim 1, reading as follows:

"1. The method of cleansing fabrics in a tub consisting in agitating a washing fluid in such a way as to create positively driven violently flowing currents moving away from

and back to the plane of the source of agitation, and also around the tub in one direction in a plane approximately parallel with the plane of agitation and then causing it to move away from and back to the plane of the source of agitation and in a reverse direction in a plane parallel with the plane of agitation so as to bodily and forcibly cause the fabrics in the tub to travel in substantially the same paths as the fluid, whereby thorough cleansing of the fabrics is effected without material contact with rubbing surfaces."

With respect to the delay the court said that the two-year delay did not defeat Snyder's right to make the claim, because the original disclosure was sufficient to sustain it. While that decision is not controlling in this cause, it is an authority which may be followed without misgiving.

The quoted verbiage is different from that of Claim 38, but the same method or process is thought to be equally embodied in both.

Claims 23 and 26 are not shown to embody any expansion of concept beyond many of those stated in the original application. If this contention had been greatly relied
1211 upon, something in the way of an analysis of the file wrapper would have been presented to indicate the advent in the process of solicitation of the alleged new and larger concept; something that could be related in point of time, to an influential exterior development in the industry or the art.

In the absence of such data, the court has relied upon its own efforts to detect in these claims, anything in extension of the assertions in the application, but without success.

Having in view all that attended the prosecution of this patent, it is thought that mere lapse of time in the formulation of these claims, ought not to count against them, when it is considered that they merely restate in essence that which was presented for allowance in June, 1922.

Whether the prosecution of the application was as diligent as circumstances would have permitted is difficult of determination, in the absence of insight which this court plainly lacks. It is necessary to take the record as it is found, and unless something inequitable in the plaintiff's cause can be directly traced to the duration of the proceedings in the Patent Office, or the incidents thereof, it is not apparent that the plaintiff's presumptive rights have been impaired.

As was earlier observed, the question of infringement is not difficult. The only argument advanced to avoid it, is that the dish-shaped impeller is vital to the Snyder patent, and as

the accused machines have flat discs, they must be held not to infringe. It is not thought that the Snyder patent is so restricted, in either its narrative or in Claims 23 and 26, and that the flat disc is equally within its scope.

1212 From what has been said, which necessarily omits reference to much that appears in the testimony, it follows that in the view of this court the defendant has not demonstrated invalidity of the Snyder patent, and that infringement has been shown on the part of each of the accused machines.

The plaintiff may have a decree for injunction and an accounting, to be settled; submit proposed findings in accordance herewith, on notice.

M. W. B.,
U. S. D. J.

1213 Motion for Reargument.

In the United States District Court, Eastern District of New York.

The Maytag Company, Plaintiff,
No. 6888. vs. In Equity.
Brooklyn Edison Company, Inc., Defendant.

Now comes defendant, the Brooklyn Edison Company, Inc., by its solicitors, Pennie, Davis, Marvin & Edmonds, and moves the Court for a reargument of the above cause, said reargument to be directed to the issue of the validity of the patent in suit as affected by the evidence introduced with respect to the Nineteen Hundred Company's Form 3 and Form 4 washing machines.

In the event the Court should deny reargument, defendant moves the Court to supplement the opinion filed in this case by adding thereto a statement of the reasons moving it to reject defendant's contentions with respect to the effect of said evidence upon the validity of the claims of the patent in suit.

1214 Because of the failure of the Court to discuss the said Form 3 and Form 4 washing machines of the Nineteen Hundred Company, it is thought that the defendant's contentions with respect thereto have been overlooked or not fully understood.

Respectfully submitted,
PENNIE, DAVIS, MARVIN & EDMONDS,
Solicitors for Defendant.

Memo. endorsed 9/23/25.

Motion denied. Settle order.

M. W. B.,
U. S. D. J.

1215 Findings of Fact and Conclusions of Law.

In the United States District Court, Eastern District of New York.

The Maytag Company, Plaintiff,
No. 6888. vs. In Equity
Brooklyn Edison Co., Inc., Defendant.

The issues in this suit having duly come on to be heard by the Court at a stated term, held by the undersigned without a jury, and the proofs, arguments and briefs of plaintiff and defendant having been duly considered, and due deliberation having been had, I decide and find as follows:

Findings of Fact.

1. Plaintiff, The Maytag Company, is the sole owner of the Snyder letters patent in suit No. 1,866,779 issued to it July 12, 1932, Claims 23, 26 and 38 of which are here asserted. Plaintiff has its principal place of business in Newton, Iowa, where it has been engaged continuously since early in 1922 in the manufacture, sale and use of washing machines embodying and utilizing the invention of said Snyder patent. Specimens of these Maytag machines are in evidence as Plaintiff's Exhibits 9, 10 and 11. These machines have been extensively sold and used throughout the United States.

1216 2. Defendant, Brooklyn Edison Company, is a corporation existing under and by virtue of the laws of the State of New York, having an office and regular established place of business in Brooklyn, within the Eastern District of New York, where subsequent to notice of infringement of the Snyder patent and between July 12, 1932, and before the filing of this suit it demonstrated, used and sold washing machines manufactured by other companies, as follows:

(a) The "A B C" machine, made by Altorfer Bros. Company, of Peoria, Illinois. (Illustrated in evidence by Plaintiff's Exhibit 73.)

(b) The "Thor" machine, made by the Hurley Machine Company and its successor, Electric Household Utilities Corporation, of Chicago, Illinois. (Illustrated in evidence by Plaintiff's Exhibits 80 and 89.)

(c) The "Easy" machine, made by the Easy Washing Machine Corporation of Syracuse, New York. (Illustrated in evidence by Plaintiff's Exhibit 1.)

Defendant also issued advertisements and instructions, furnished it by these manufacturers, in connection with the demonstration and sale of these machines.

3. Each of said defendant's machines, A B C, Thor and Easy, employs and utilizes the invention of said Snyder patent and operates in substantially the same way as the Maytag machines made thereunder by the plaintiff. A comparison of the Maytag machines and said defendant's ma-
1217 chines, as supplemented by the testimony, reveals unmistakably that there is no fundamental difference between them. The mechanism, method of operation and the physical characteristics are in such close resemblance that the issue of infringement presents no problems.

4. The numerous tests made on behalf of the defendant in open court failed to establish its contentions that said Maytag and the defendant's machines do not operate in accordance with the description and claims of the patent in suit.

5. Actual observation of the operations and plaintiff's and defendant's Easy machine in open court demonstrated that each when not overloaded operates in substantial accordance with the teachings of the Snyder patent and the claims here asserted, and it is also apparent from the record that the Thor and A B C machines operate in substantially the same manner as each of these machines.

6. Successive types of washing machines previous to the Snyder invention have been known as the rub-board, the peg-dolly, the oscillating type, the cylinder type and the vacuum-cup type, of which the peg-dolly was probably in greatest distribution between 1915 and 1920. For many years prior thereto washing machines had come to occupy an important part in the domestic economy of the country. The mitigation of the rigors of a prosaic task which was their purpose has been a constant challenge to inventive skill from 1809. The operations of the various types of washing machines which preceded the machine of the patent in suit consisted of so disposing of mechanical agents in a closed con-
1218 tainer or wash tub that the necessary deformation of the threads of the fabrics being washed was undertaken by subjecting the fabrics to contact with ribs or corrugations or similar obstacles contained in the tub itself.

7. The teaching of the Snyder patent, stated in simple language, is that it departed from the understanding prevalent in 1920 or thereabouts that washing machine technique required for its success a method of rubbing, dragging,

squeezing, twisting and manipulating the clothes within the tub so as to duplicate the process involved in the manual use of the scrub or wash board, when washing was accomplished entirely by hand, and substituted for that a process of contorting the fabrics mainly by water action, so that the deformation of the threads and consequent dislodgement and migration of foreign particles from the meshes and threads themselves would be accomplished without subjecting the fabrics to the heavy wear and tear previously encountered. The Snyder invention accomplished this new result. It washes clothes satisfactorily. It was a response to repeated efforts to meet known requirements, has been commercially successful and has largely supplanted the previous types of machines.

8. The Snyder invention, as embodied in the Maytag machine, consists of a tub, in the bottom of which is a power-driven impeller called a gyrator, consisting of a disc substantially less in diameter than the tub, having a cone-shaped center, and upon the disc are mounted four radially disposed blades. This impeller is oscillated at such speed as to set in motion violently opposed currents of water which establish a flow outward from the bottom center of the tub, upward at the sides to the surface of the water, and back to the center and down to the inner portion of the impeller blades. The fabrics being washed, if the mass is not too great, follow that course, turning over constantly. The water is hot and contains soap, and at the end of ten minutes, more or less, the fabrics so treated are cleansed. The success of the operation is not questioned.

1219

9. The specifications of the Snyder patent are sufficently "full, clear, concise and exact" as to enable manufacturers to make the Snyder washing machine and operate it in accordance with the teachings of the patent. The drawings forming a part of the application have not been criticized by the defendant, and when they are read with the recitals it cannot be said that the patentee failed to lay bare his concept, and the way in which he embodied it, with sufficient definition to apprise the public and those possessing the conventionally denominated skill of the metes and bounds of the invention.

10. The Snyder machine was a new step and an advance over previous machines in that the water action became the major factor in the operation and so functioned as to distort and manipulate the fabrics and thereby cause deformation of the thread. If this was aided by such contact with the impeller as does take place (Snyder did not teach its ab-

sence) the latter is the subordinate and not the dominant phase of the accomplishment. Deformation of the threads is essential. When Snyder said that he caused the
1220 several threads to be acted upon as a result of the interplay of the interposed currents of water upon the fabrics which were set in motion by the impeller, as he described, he made a statement which has not been disproved by the evidence in this case.

11. The Maytag machine, embodying the Snyder invention, was first put on the market in 1922 and substantial sales were made in that year; subsequent commercial success has rewarded the plaintiff, so that down to the trial some 2,000,000 machines have been sold, of which 172,000 had the low center post illustrated in the patent, and the balance the high center post later adopted. That element is conceded not to affect the issues here involved.

12. Comparatively little advertising of the Maytag machine embodying the Snyder invention was done down to 1925, but its sales were naturally accompanied by increasing publicity and large sums came to be expended for advertising in later years. This was after competitor's machines of the same type appeared upon the market.

13. At the outset the dealers were skeptical concerning the claims of the plaintiff that its new washing machine so operated as to wash clothes by water action. Competitors who were then selling the various types of previous machines above referred to fostered that skepticism. It is not contradicted that plaintiff's machine was referred to in trade circles as an ensilage cutter, and was otherwise derided both by dealers and salesmen from competing manufacturers.

1221 14. Contemporaneously with the early introduction of the Maytag machines the A B C Company and the Easy Company, manufacturers of the defendant's A B C and Easy machines, respectively, acquired Maytag machines, embodying the Snyder invention, for the information of their experimental staffs.

15 In about 1925 and 1926 competitors' machines appeared upon the market of the same type as Maytag, that is, they had a bottom positioned impeller, power driven, and of the same general appearance, and the same claims were made for them in pamphlets issued by the manufacturers as were made by the Maytag Company, namely,—that in these machines, washing was done by water action with resulting saving in time and wear and tear upon the fabrics. That con-

dition has continued to prevail down to the time when this suit was started.

The assertions in all of the advertising matter, and there is a substantial bulk in evidence, are flamboyant and unrestricted to the effect that the A B C, Easy and Thor washing machines do their work by water action, etc. The defendant itself distributed some of these pamphlets.

16. The issuance of the Snyder patent was delayed for over six years by a vigorously contested interference proceeding resulting in a decision in Snyder's favor by the Court of Customs and Patent Appeals (Unruh vs. Snyder, 42 Fed. (2) 1038) and another such proceeding was attempted by Altorfer without success. The consideration given the Snyder invention and application by the various tribunals of the Patent Office and the Court during these proceedings
1222 and the unusual strain and stress of this searching process strengthens the usual presumption arising out of the issue of a patent.

17. None of the prior patents, publications, uses or prior inventions relied upon by the defendant show or disclose a washing machine or method of washing fabrics such as shown and described in the patent in suit or set forth in Claims 23, 26 and 38 thereof, or any which negative the patentable novelty of any of these claims. (See opinion filed July 19, 1935.)

18. Having examined the prior patents relied upon by the defendant, it is apparent that none of these accomplish the water action of the Snyder patent in washing clothes, fabrics and the like, and that the presence of a suggestion as to water action contained in some of them does not establish anticipation of Snyder. Various of the patents referred to fall within the general category of unsuccessful efforts to accomplish the cleansing of fabrics mainly by water action. The art prior to 1922 did not contain a machine that accomplished the results of the Snyder machine. Once the distinction is grasped between intention and accomplishment as revealed in the several prior patents, it becomes apparent that the presence of the former does not establish anticipation of the latter.

19. None of the accused A B C, Thor or Easy machines measurably approaches any of those described in the prior patents relied upon by the defendant.

1223 20. As the result of observations of numerous demonstrations in the court room with washing machines of the Maytage type, embodying the Snyder invention, including those of plaintiff's manufacture and the Easy ma-

chine here charged to infringe, this Court finds that the major factor in cleansing the fabrics is the water action which so functions as to distort and manipulate the fabrics and thereby to cause thread deformation; such contact between the fabrics and the impeller as does take place, is the subordinate and not the dominant phase of the accomplishment.

To liken the effect of the impeller blade upon adjacent fabrics to the pounding of clothes upon a rock, practiced in primitive days, is to fail entirely to distinguish between an underwater thrust and a blow delivered out of water. The force of the motion of the impeller blade is largely expended in moving the water in which the impeller is immersed, and while there is seemingly an observable contact between the fabrics and the impeller when even a normal or capacity load of materials is treated, the actual striking energy of the blade is obviously inconsiderable; no persuasive demonstration was made by the defendant whereby such energy was recorded in terms of force or power. The defendant has failed to prove that it is impossible to wash fabrics in the Maytag or other machines of the same type according to the teachings of the patent.

21. The numerous demonstrations of plaintiff's and defendant's Easy machine in the court room were carefully observed by the Court for long periods of time. Some of them were conducted in glass tubs so illuminated as
1224 to reveal all that the eye can perceive. The Court's observation of these demonstrations was as follows:

(a) The course of flow described in the patent takes place in all these machines;

(b) There was a constant turning of fabrics called roll-over which was not impeded by the temporary engagement of the materials with the impeller;

(c) There was a flexing and doubling back of the fabrics as they were driven in and around the tub by the violently flowing opposed currents of liquid created by the impeller;

(d) There was no perceptible rubbing of the fabrics against the smooth interior of the tub as distinguished from movement along that smooth interior;

(e) The fabrics moved outward from down between the blades of the impeller;

(f) The operations in these machines are incapable of statement in exact terms;

(g) Lint was present in the water after a period of operation of the machines in question, but that is not incompatible with the cleansing process of the Snyder patent. There was no comparison of the amount of lint found in the water of the Maytag machines with that found following the washing of the same materials in a peg dolly machine, and hence no conclusion can be drawn from the presence of lint in the Maytag type machine.

1225 22. The demonstrations of devices in open court asserted by defendant to correspond with the structures and operations of various prior patents failed to show anything that disclosed the invention of the Snyder patent or its claims in suit.

23. That because of the idiosyncracies of individual technique, raiment, water, the degree of soil and its character, and the size and texture of the articles to be cleansed there was no necessity for specifying in the Snyder patent or elsewhere the load of clothes that could be conveniently handled in the plaintiff's machine. Proper loading to obtain the results of the Snyder patented invention is a mere matter of experience and observation.

24. The patent is sufficiently clear and explicit with regard to speed of oscillation of the impeller. The patentee states the requirement of sufficient speed to accomplish the definite objects stated.

25. The testimony taken both by deposition and in open court, under an amendment to the answer made just prior to the trial, concerning alleged prior invention by Altorfer, fails to establsh either anticipation of the Snyder invention or any date of reduction to practice of the alleged work by Altorfer prior to Snyder's reduction to practice. The Altorfer evidence is deemed insufficient to show more than desultory experimenting prior to Altorfer Brother's knowledge of the Snyder-Maytag machine in 1922.

26. The testimony taken in open court shows that Snyder disclosed his invention to Frederick F. Mason on January 21, 1921, and that Snyder's reduction to practice pre-
1226 ceded that date by several months.

27. Snyder had sufficient blade surface to impart outward force or throw of water and this was assisted by the dish-shaped disc. Many claims not in suit specify that form of disc, but Claim 23 does not specify it in terms or by implication. The reference to the "adjacent portion of the impeller base" in that claim means the inner portion as well as that near the rim. The same is true of Claim 26.

28. These claims are in harmony with the invention as described in the specification and the disclosure of the latter was sufficiently broad to support a claim which did not embrace a dish-shaped disc exclusively, but a flat disc was equally within the conception as stated.

29. Claims 23 and 26 in suit are not shown to embody any expansion of concept beyond many of the claims stated in the original application. There is nothing in these claims in extension of the assertions in the application.

30. The method described in Claim 38 of the patent in suit is novel and there is no evidence to the effect that the method covered thereby could not be practiced in a machine of another design.

31. The method of Claim 38 of the patent in suit was considered in the interference proceeding of Unruh vs. Snyder, 49 Fed. (2) 1038. It there appeared that Snyder's method, Claim 1, was filed in July, 1924, more than two years
1227 after the application. All of the tribunals of the Patent Office and the Court of Customs and Patent Appeals held that this did not defeat Snyder's right to make the claim because the original disclosure was sufficient to sustain it. This Court agrees with that finding. The verbiage of said Claim 1 quoted in said decision is different from the verbiage of Claim 38, but the same method or process is equally embodied in both.

32. The Court's careful examination of the extensive Patent Office proceedings disclose nothing inequitable on the part of the plaintiff throughout these entire proceedings. It does not appear that plaintiff's presumptive rights have been impaired by any action or occurrence during those proceedings.

33. Further findings on specific points in addition to those herein mentioned will be found in the opinion of this Court filed on or about July 19, 1935.

Conclusions of Law.

1. The Court has jurisdiction of the subject matter and of the parties.

2. The title of the patent in suit is vested in the plaintiff and plaintiff may maintain suit to restrain infringement of it.

3. Letters Patent in suit No. 1,866,779 are good and valid in law.

4. Claims 23, 26 and 38 of said Letters Patent in suit have each been infringed by defendant subsequent to the
1228 grant of said patent, after notice and prior to the filing of the bill of complaint herein.

5. Plaintiff is entitled to a perpetual injunction restraining said defendant, its privies and employees and those in active concert or participating with them from infringing said claims, and to recover the profits and damages resulting from the infringement as determined by an accounting, together with the costs of this suit.

MORTIMER W. BYERS,
United States District Judge.

Dated: October 7, 1935.

1229 Interlocutory Decree.

United States District Court, Eastern District of New York.

The Maytag Company, Plaintiff,
No. 6888. vs. In Equity
Brooklyn Edison Co., Inc., Defendant.

This cause having been brought on for final hearing upon the pleadings and proofs and after hearing arguments of counsel and considering briefs submitted on behalf of both parties, it is now Found, Adjudged and Decreed:

First: That the patent in suit, being United States Letters Patent No. 1,866,779, dated July 12, 1932, for "Washing Machine," granted to Howard F. Snyder, as assignor to The Maytag Company, is good and valid, particularly as to the claims asserted (23, 26 and 38) and is the property of the plaintiff; that said Letters Patent in respect to all the claims included in the charge of infringement, being Claims 23, 26 and 38, has been infringed by the defendant, the Brooklyn Edison Company, Inc., a New York corporation, with its principal place of business in the Borough of Brooklyn, New York City, State of New York, within the Eastern District of New York, by the demonstration, sale and use and causing and contributing to the use of washing machines known as:

1230 (a) The "A B C" machine, made by Altorfer Bros. Company, of Peoria, Illinois. (Illustrated in evidence by Plaintiff's Exhibit 73).

(b) The "Thor" machine, made by the Hurley Machine Company and its successor, Electric Household Utilities Corporation, of Chicago, Illinois. (Illustrated in evidence by Plaintiff's Exhibits 80 and 89.)

(c) The "Easy" machine, made by the Easy Washing Machine Corporation of Syracuse, New York. (Illustrated in evidence by Plaintiff's Exhibit 1.)

Second: That a perpetual injunction issue in due form of law against said defendant, the Brooklyn Edison Company, Inc., enjoining it and those in privity with it, their officers, agents, servants, employees and attorneys and those in active concert or participating with them and each of them, from directly or indirectly manufacturing, selling, using, advertising or offering so to do, any washing machine or part thereof infringing Claims 23 and 26, or either of them, of the Snyder patent No. 1,866,779, dated July 12, 1932, or any device embodying or utilizing the same, and particularly the Easy, the A B C and the Thor washing machines (represented in evidence respectively by Plaintiff's Exhibits 1, 73, 80 and 89) and from directly or indirectly selling, using, advertising or offering for sale any devices for utilizing the method of washing fabrics of Claim 38 of said patent, and from in any manner using, employing or advertising said method, or in any wise contributing thereto, and from
1231 in any respect infringing upon said Snyder Patent or aiding or abetting or in any way inducing or contributing to the infringement thereof.

Third: That the plaintiff recover of defendant the profits which it has derived by reason of the aforesaid infringement and the damage which the plaintiff has sustained by reason of said infringement; that this cause be referred to William E. Warland, as Master of this court, to take and state an accounting of said profits and damages and assess the same, and report thereon pursuant to the statutes and the equity rules in such cases made and provided.

Fourth: That the plaintiff recover its costs in this suit.

Dated: October 7th, 1935.

MORTIMER W. BYERS,
United States District Julge.

PLAINTIFF'S EXHIBIT 33.
W. D. Mo. 1949
D. C.
THE MAYTAG COMPANY
Paper No. 5
859

Final Hearing
October 5, 1928.

BTR/LAW

In the United States Patent Office.

Patent Interference No. 54,516.

PATENT OFFICE
OCT 12 1928
MAILED

Unruh vs. Snyder.

Washing Machine.

Reissue application of Cornelius C. Unruh filed June 18, 1925, No. 38,109, reissue of Patent No. 1,459,485, granted June 19, 1923, on an application filed January 22, 1923, No. 614,152.

Application of Howard P. Snyder filed June 14, 1922, No. 568,158.

Messrs. Williamson, Reif and Williamson, and Messrs. Milans & Milans for Unruh.

Mr. Wallace R. Lane for Snyder.

The subject matter of this interference is a washing machine of the type involving an agitating member mounted on a vertical axis.

The issue is defined in the following counts:

1. The method of cleansing fabrics in a tub consisting in agitating a washing fluid in such a way as to create positively driven violently flowing currents moving away from and back to the plane of the source of agitation, and also around the tub in one direction in a plane approximately parallel with the plane of agitation and then causing it to move away from and back to the plane of the source of agitation and in a reverse direction in a plane parallel with the plane of agitation so as to bodily and forcibly cause the fabrics in the tub to travel in substantially the same paths as the fluid, whereby thorough cleansing of the fabrics is effected without material contact with rubbing surfaces.

2. A washing machine comprising in combination, a container having a substantially uninterrupted inner surface, a rotary reciprocatory disk-like impeller mounted through the bottom of the container, so constructed and arranged that when water and materials to be cleaned are placed in the container and the impeller is reciprocated, the water will first be violently forced laterally and upwardly in one gyratory direction and then laterally and upwardly in an opposed gyratory direction, so that the materials being cleaned will be suspended by the movement of the water, and the water forced through and around the materials to thoroughly cleanse them, while said materials are substantially out of rubbing contact with the mechanical parts of the machine,

and motor-driven means for rapidly driving the impeller.

3. In a washing machine the combination of a tub for containing a cleansing substance and the materials to be cleansed, said tub having an outwardly and upwardly inclined portion, an impeller cooperating with the said inclined portion of the tub to force said cleansing substance and materials to be cleansed outwardly in a direction substantially parallel with said inclined portion, and power means for oscillating said impeller.

4. In a washing machine the combination of a tub adapted to contain wash water and goods to be washed, said tub having a flared portion, a liquid impeller in said tub having a depressed portion, said liquid impeller co-operating with said flared portion, to swirl said wash water and goods with a substantially gyratory movement, and power means to alternately rotate said liquid impeller.

5. In a washing machine comprising driving power means, the combination of a tub for containing a cleansing substance and materials to be cleansed, a liquid impeller, mechanism driven by said power means for oscillating said liquid impeller, said liquid impeller having flanges and a radially depressed portion operative to upwardly swirl said cleansing substance and material.

6. In a washing machine comprising a driving power means, the combination of a tub for containing washing and washable materials, a liquid impeller, means operable to alternately rotate said liquid impeller, said liquid impeller being provided with an upstanding flange and a depressed portion on each side of said flange and operative to swirl said materials with a substantially gyratory movement.

7. In a washing machine comprising driving power means, the combination of a tub for containing a cleansing substance and materials to be cleansed, a liquid impeller mechanism driven by said power means for alternately rotating said liquid impeller, said liquid impeller having upwardly and radially extending flanges and a radially depressed surface operative to upwardly swirl said cleansing substance and materials.

8. In a washing machine comprising driving power means, the combination of a tub adapted to contain washing and washable materials, a liquid impeller in said tub operated by said means, said liquid impeller having a portion and radially depressed portion, and operable to swirl said materials with a substantially gyratory movement.

9. In a washing machine having driving power means, the combination of a tub adapted to contain washing and washable materials, a liquid impeller in said tub and operated by said means, said liquid impeller having a centrally raised portion, a radially depressed portion and flanges extending radially from said centrally raised portion, said liquid impeller operable to swirl said materials with a substantially gyratory movement in said tub.

10. In a washing machine having driving power means, the combination of a tub adapted to contain washing and washable materials, a liquid impeller in said tub and operated by said means, said liquid impeller having a central conoidal portion, an inclined peripheral portion and an intermediate trough portion,

said liquid impeller operating to swirl said materials with a substantially gyratory movement in said tub.

11. In a washing machine comprising a driving power means, a tub, an alternating rotary liquid impeller having a plate formed with an annular depression, a raised central portion and upstanding flanges in said depression, said plate, depression, central portion and flanges operating on the contents of the tub to give the contents a gyratory movement.

12. An agitating member for a washing machine comprising a cup-shaped disk having a frusto-conical portion rising from the center thereof, the vertical elements of which are concave so that the surface of said portion merges into the surface of said disk, and a round upwardly tapering portion projecting above said frusto-conical portion and terminating in a rounded surface, and narrow radial wings projecting from said latter portion and extending along the sides thereof and across the surface of said disk and having rounded outer edges merging into the concave surface of said disk.

13. A dolly for a washing machine comprising an annular trough, a stem rising centrally from said trough and having a plurality of circumferentially spaced radial wings projecting therefrom and extending along its sides and across the surface of said trough the top surface of said wings above said trough curving downwardly and inwardly.

14. A rotatable dolly for a washing machine adapted to be disposed in a liquid containing receptacle comprising a dish-shaped member having a central upstanding tapered stem with a rounded upper end, ribs extending across said dish and upwardly along the side of said stem and having rounded upper edges merging into the rounded surface of said stem.

15. In a washing machine an agitator and power means for imparting alternate rotative movement thereto, said agitator consisting of a substantially disk-like imperforate body and a plurality of liquid impelling projections extending from one face thereof, said projections being of a maximum depth contiguous to the periphery of said body and having their free edges inclined inwardly to the center of the agitator, leaving the central portion of said body free of water impelling projections.

16. In a washing machine, a tub having side walls and a bottom, a driving shaft extending through said bottom into the tub, an agitator fixed to said shaft to oscillate therewith, power means for oscillating said shaft and agitator, said agitator comprising a substantially circular base having an upstanding central portion, blades extending upwardly from the upper face of said base, the blades being of greatest height adjacent the marginal edge of the base, decreasing in height toward the center and merging into said upstanding central portion, the union between the agitator and the shaft permitting removal of the former from the latter by an upward movement, the oscillation of the agitator causing the blades to set up a violent movement of the fluid and tub contents outwardly away from the agitator, upwardly, inwardly, and then back toward the agitator, there also being superposed on this circulatory movement a movement of the fluid and tub contents first in one direction circumferentially of the tub and then in the other, so that the articles being washed will be thoroughly cleansed without any material rubbing of the blades thereagainst.

17. In a washing machine, a tub, a driving shaft extending into the tub, an agitator secured to said shaft to oscillate therewith, power means for oscillating said shaft and agitator, said agitator comprising a substantially circular body portion having blades extending therefrom on the face presented to the material being washed, the blades adjacent the marginal edge of the body portion being of a substantial dimension in a direction at right angles of the body portion, said body portion being free of any holes or openings of substantial dimensions, said blades and adjacent portions of the body portion of the agitator when the agitator is oscillated throwing the fluid in the tub, and material being washed, violently outwardly from the edge of the agitator whereby it will flow in circulatory paths away from the agitator, along the sides of the tub, then inwardly toward and back to the agitator, this cycle being continuously repeated.

18. A washing machine comprising in combination, a container having a substantially uninterrupted inner surface, a rotary reciprocatory disk-like impeller near the bottom of the container having upstanding flanges thereon so arranged as to violently force water in the container laterally and upwardly in one gyratory direction and then laterally and upwardly in an opposed direction, whereby the materials being washed will be substantially suspended by the water and thoroughly cleaned while thus suspended, and motor driven means extending through the bottom of the container to rotatably reciprocate the impeller.

19. In a washing machine, a tub for containing wash water and goods to be washed, an oscillatory disk-like agitator in said tub near the bottom thereof and having a plurality of upstanding water-impelling projections extending from one face thereof, said projections being of substantial height contiguous to the periphery of the agitator and decreasing in height toward the center whereby side faces of substantial area are provided, and while the agitator is oscillated the water and goods will be vigorously forced laterally upwardly in gyratory paths to violently force the water through, between and around the goods and thoroughly cleanse them while they are sustained in the water free from any substantial contact with rubbing surfaces, and motor-driven means for oscillating the agitator.

20. In a washing machine, a tub having a substantially uninterrupted inner surface and adapted to contain cleansing liquid and materials to be washed, the bottom of the tub merging smoothly into the sides, an oscillatory liquid impeller mounted adjacent the bottom of the tub, having on its upper surface upstanding wing-like means of substantial height and length so constructed and arranged that when the impeller is given a rapid rotary oscillatory movement the cleansing liquid and materials to be washed will be violently forced laterally from the impeller then upwardly along the side of the tub, then away from the tub side and back toward the impeller, this cycle being continuously repeated to force the cleansing liquid through and around the materials to be washed to thoroughly cleanse them while they are substantially out of rubbing contact with the impeller, and motor-driven means for imparting to said impeller a rapid rotary oscillatory movement.

The interference as originally declared, comprised thirty-one claims as to which the preliminary statement of the junior party, Unruh, alleged no date prior to the senior party's filing date. Notice was therefore given to Unruh that judgment on the record would be issued against him unless he showed cause why this should not be done. Unruh then filed a motion to dissolve, which was granted as to fourteen counts and denied as to the remainder (present counts 1 to 17). Counts 18 to 20 were added as the result of a motion by Snyder, and, as to these counts, Unruh alleged a date of conception prior to Snyder's filing date and was, therefore, allowed to take testimony.

This testimony clearly establishes no date prior to Snyder's filing date, for either conception, disclosure or reduction to practice by Unruh and in the memoranda filed in behalf of Unruh, there is no contention that any such date is established.

The sole point raised by these memoranda is the right of Snyder to make the claims in issue. The law examiner, in ruling on Unruh's motion to dissolve and on Snyder's motion to add counts, has affirmed Snyder's right to make each of the counts. In accordance with Rule 130, therefore, this question cannot be reconsidered by the examiner of interferences except in view of evidence which was not before the law examiner. The evidence relied on by Unruh relates to the machines marketed by Snyder's assignee and is not seen to have any bearing on the question of whether or not the Snyder application discloses the invention in controversy. Unruh's testimony is thought to afford no basis whatever for a Holding contrary to that reached by the law examiner on the question of Snyder's right to make the counts.

Priority of invention of the subject matter in controversy is awarded to Howard P. Snyder, the senior party.

Limit of appeal: November 12, 1928.

October 12, 1928.

P. J. Lorentzen
Examiner of Interferences.

54816.

PLAINTIFF'S EXHIBIT 33.

Appeal No. 850 Paper No. 62

Decision

U. S. PATENT OFFICE
BOARD OF APPEALS
DEC 31 1929
MAILED

869

Appeal No. 850

MCV

Hearing:
Sept. 6, 1929.

IN THE UNITED STATES PATENT OFFICE

BEFORE THE BOARD OF APPEALS

Unruh v. Snyder

Patent Interference No. 54,316 between the application of Cornelius C. Unruh filed June 18, 1925, Ser. No. 38,109, for reissue of Patent No. 1,459,485, granted June 19, 1923, on application filed Jan. 22, 1923, Ser. No. 614,132, and the application of Howard F. Snyder filed June 14, 1922, Ser. No. 568,158. Washing Machine.

Messrs. Williamson, Reif & Williamson and Messrs. Milans & Milans for Unruh.
Mr. Wallace R. Lane for Snyder.

This is an appeal by the party Unruh from the decision of the examiner of interferences awarding priority of invention in favor of the senior party Snyder.

Unruh is involved in the interference on an application filed June 18, 1925 for the reissue of his patent No. 1,459,485 granted June 19, 1923 on an application filed January 22, 1923. The application of Snyder in the interference was filed June 14, 1922.

The only question urged in appellant's brief and at the hearing, and therefore the only question that we are called upon to consider, is the right of Snyder to make counts 1, 12, 13 and 14 of the issue. This question was raised by Unruh in a motion to dissolve, thus giving him the right to urge it on this appeal under Rule 130.

Count 1 reads as follows:

1. The method of cleaning fabrics in a tub consisting in agitating a washing fluid in such a way as to create positively driven violently flowing currents moving away from and back to the plane of the source of agitation, and also around the tub in one direction in a plane approximately parallel with the plane of agitation and then causing it to move away from and back to the plane of the source of agitation and in a reverse direction in a plane parallel with the plane of agitation

54316 343

so as to bodily and forcibly cause the fabrics in the tub to travel in substantially the same paths as the fluid, whereby through cleansing of the fabrics is effected without material contact with rubbing surfaces.

Unruh contends that Snyder has no right to make this process claim because the Snyder application was filed June 14, 1922 for certain alleged improvements in a machine and "it was not until by amendment more than two years later, July 19, 1924, that the alleged invention of the method was injected into the application."

We agree with the law examiner that the process was disclosed in the original application of Snyder and that count 1 reads on the specification as filed. The fact that Snyder did not present process claims for more than two years after the application was filed is not fatal to his right to make the claim. The decision of Chapman et al. v. Wintroath 252 U.S., 126 is not applicable but that of John R. Williams Co. et al. v. Miller, Du Briel & Peters Mfg. Co. 1901 C.D., 517, cited by the law examiner, is believed to be directly in point.

Count 12 reads:

12. An agitating member for a washing machine comprising a cup-shaped disk having a frusto-conical portion rising from the center thereof, the vertical elements of which are concave so that the surface of said portion merges into the surface of said disk, and a round upwardly tapering portion projecting above said frusto-conical portion and terminating in a rounded surface, and narrow radial wings projecting from said latter portion and extending along the sides thereof and across the surface of said disk and having rounded outer edges merging into the concave surface of said disk.

Unruh contends that this count is not readable on Snyder's disclosure.

We note that the last line of the count specifies that the wings have "rounded edges merging into the concave surface of said disk." The law examiner points out that the edges merge into the disk at 55 in Fig. 4 of Snyder and are rounded at their upper ends. He held that the "count does not specify that the rounded part of the outer edges merge into the concave surface of the disk."

We are unable to concur in this holding of the law examiner. In our opinion the count calls for a construction in which the rounded outer edge merges into the concave surface of the disk. It is not fairly shown in appellant's construction where a straight outer edge merges into the concave surface of the disk and is surmounted by a rounded corner. We accordingly find that Snyder cannot make count 12.

Count 13 reads:

> 13. A dolly for a washing machine comprising an annular trough, a stem rising centrally from said trough and having a plurality of circumferentially spaced radial wings projecting therefrom and extending along its sides and across the surface of said trough the top surface of said wings above said trough curving downwardly and inwardly.

The last line of this count calls for "the top surface of said wings above said trough curving downwardly and inwardly." In holding that Snyder can make this count the law examiner said - "The top surface of the wings above the trough curve downwardly and inwardly as shown at 56 at the left of Fig. 4." While it is true that the straight horizontal upper edge or surface of the wing is shown as joined to the straight inclined surface at 56 by a curve rather than an angle, this curve constitutes too small a part of the top surface of the wing to fairly support the count. Appellant does not contend that this portion of the count reads exactly on his disclosure but he states (brief, page 42) -

> While it is obvious that the edges of the wings 56 do not conform to the arc of a circle, they are the full equivalent of the curved edges or lobes 17 of the Unruh patent on which the claim purports to be based, and function absolutely the same.

It is well settled in interference practice, however, that no element of the issue can be disregarded and that the question of equivalency will not be considered in determining a party's right to make the count of the issue (Streat v. Freckleton 1899 C.D., 85; Collum v. Thurman 1907 C.D., 330; Wilson & Forrest v.

Ellis 1915 C.D., 69 and Bijur v. Rushmore 1918 C.D., 122).

It is further noted that counts 12 and 13 are claims 5 and 6, respectively, of Unruh's original patent. Therefore, if there is any doubt as to the meaning of these counts they should be construed in accordance with Unruh's disclosure.

Count 14 reads:

> 14. A rotatable dolly for a washing machine adapted to be disposed in a liquid containing receptacle comprising a dish-shaped member having a central upstanding tapered stem with a rounded upper end, ribs extending across said dish and upwardly along the side of said stem and having rounded upper edges merging into the rounded surface of said stem.

This count is thought to read fairly on the Snyder disclosure. Concerning the last portion of the count it is noted that the upper edges of the ribs are rounded or curved where they merge into the rounded surface of the stem.

In our opinion Snyder has the right to make counts 1 and 14 but does not have the right to make counts 12 and 13.

The decision of the examiner of interferences awarding priority in favor of Snyder is affirmed as to counts 1 and 14, and is reversed as to counts 12 and 13.

M. J. Moore
Assistant Commissioner

W. S. Ruckman
Examiner-in-Chief

Board of Appeals

Eugene Landers
Examiner-in-Chief

December 31, 1929

PLAINTIFF'S EXHIBIT 35.

850 Paper No. 66

877

U. S. PATENT OFFICE
BOARD OF APPEALS
JAN 31 1930
MAILED

Appeal No. 850
Petition for Rehearing.

IN THE UNITED STATES PATENT OFFICE

BEFORE THE BOARD OF APPEALS

Unruh v. Snyder

Patent Interference No. 54,316 between the application of Cornelius C. Unruh filed June 14, 1928, Ser. No. 38,109, for reissue of Patent No. 1,469,483, granted June 19, 1923, on application filed Jan. 22, 1923, Ser. No. 614,128, and the application of Howard F. Snyder filed June 14, 1928, Ser. No. 568,158. Washing Machine.

Messrs. Williamson, Reif & Williamson and Messrs. Milans & Milans for Unruh.
Mr. Wallace R. Lane for Snyder.

The party Snyder has presented a petition for a rehearing of the matter decided by us December 31, 1929.

After a careful consideration thereof we find no reason presented therein which leads us to believe that our decision is in error or that a different conclusion would result if a rehearing were granted.

As noted in our decision, the counts 12 and 13, in question, are claims of Unruh's original patent. The structure claimed is clearly disclosed in Unruh's drawing and the radial ribs 17 are described in the specification and stated to be "of lobe shaped formation." These counts are specific to Unruh's construction. For reasons stated in our decision they are not supported by the disclosure of Snyder and he has no right to make them. Under the long established practice noted in the decisions of both the Patent Office and the Courts, cited by us, these limitations in the counts not disclosed by Snyder cannot be disregarded in considering the right of Snyder, who copied the

411 54316.

claims for interference purposes, to make the same. Under the above circumstances the matter of whether Umruh disclosed these limiting features prior to the filing of his application is immaterial.

In lines 4 and 24, page 3 of our decision, the word "appellant" should read appellee. It is perfectly clear by the context that the party Snyder was intended in both instances. No confusion has resulted and this error affords no ground for a rehearing.

The petition is denied.

Assistant Commissioner

Examiner-in-Chief

Examiner-in-Chief

Board of Appeals

January 31, 1930

PLAINTIFF'S EXHIBIT 36. 881

W. D. Mo. W. D.

THE MAYTAG COMPANY

vs.

GENERAL ELECTRIC SUPPLY CORPORATION

IN EQUITY 2032

HISTORY ~~DEFENDANTS~~ EXHIBIT 36

OF THE APPLICATION WHICH

RESULTED IN

PATENT NO. 1,240,828, D A V I S, ISSUED SEPT. 25, 1917

REFERENCES:

U. S.

180,299, Willis

289,615, Bush

567,703, Chesnut

126,030, Cooper

245,300, Hoffmann

FOREIGN:

N o n e

1916

(Serial Number)
81,200

DIV. 27 25

PATENT NO. 1,240,626

GEORGE L. DAVIS

AGITATOR FOR WASHING-MACHINES

PATENTED SEPTEMBER 25, 1917

Application filed complete Feb. 29, 1916

Notice of Allowance dated Aug. 17, 1917

Final Fee, Cash $20., paid Aug. 24, 1917

Attorney:

C. A. Snow & Co.
Washington, D. C.

CONTENTS

1. APPLICATION PAPERS
2. Rejection, Mar. 16, 1916
3. Amendment A, Feb. 21, 1917
4. Rejection, Mar. 10, 1917
5. Amendment B, Aug. 9, 1917
6. Notice of Suit, Feb. 12, 1926
7. Notice of Suit, Jan. 25, 1928

(Class 259-96)

SEARCHED

Class	Sub	Date	Ex'r.
68	24	Mar.17,1916	DOM

3088

APPLICATION PAPERS, Feb. 29, 1916: 885.

PETITION (giving Applicant's post-office address as Binghamton, New York) and POWER OF ATTORNEY in usual form; no changes.

SPECIFICATION

See specification of patent attached; amended as indicated.

CLAIMS

SUB A4

1. An agitator for washing machines, including a buoyant disk, radially disposed ribs upon the lower face of the disk and forming spaces therebetween communicating at the center of the disk.

2. An agitator for washing machines, including a buoyant disk, oppositely disposed groups of radial ribs upon the lower face of the disk and arranged about a central suction space in communication with the spaces between all of the ribs, and diametrically disposed ribs interposed between said groups and having their inner ends spaced apart but extended into said suction space.

3. An agitator for washing machines, including a buoyant disk, oppositely disposed groups of radial ribs upon the lower face of the disk and arranged about a central suction space in communication with the spaces between all of the ribs, and diametrically disposed ribs interposed between said groups and having their inner ends spaced apart but extended into said suction space, all of the ribs having their inner ends beveled and their outer ends substantially flush with the margin of the disk.

5888

OATH

Executed February 23, 1916; does not recite foreign applications or patents.

---:---

Paper No. 2

REJECTION, Mar. 18, 1916:

Page 3, line 2, injuring is misspelled.

The claims are rejected as defining nothing patentable over the patents to

Willis 180,899 July 25, 1876, and

Bush 389,615 Dec. 4, 1888, Rotary Rubber,

especially in view of the patent to

Chestnut 567,703 Sept.15, 1896, Agitator.

Both Willis and Bush show the upper agitator formed in the manner shown by applicant and both of these dollys are formed in a manner to float on the surface of the water. The patent to Chestnut is added to show more specifically the buoyant dolly.

JRS C. H. Gould, Mar. 18, 17

---:---

Paper No.

AMENDMENT A, Feb. 21, 1917:

In answer to the [illegible]

1916, please amend the above [illegible]

lows:

Specification [illegible]

of patent attached; see also [illegible]

Claims cancelled and [illegible]

inserted in lieu thereof.

SUB. B' 1. A washing machine including an agitator disk, ribs thereon, said ribs being beveled on their inner terminals to indicate the substantial conformation of an inverted bowl to prevent churning of the washing fluid.

2. A washing machine including an agitator disk, ribs thereon arcuately disposed, other ribs thereon adapted to coact with said first named ribs to form fluid flow lines A4 in the shape of an elongated loop depressed intermediate its ends.

3. A washing machine including an agitator disk, ribs thereon, said ribs being beveled on their inner terminals to indicate the substantial conformation of an inverted bowl to prevent churning of the washing fluid, other ribs therefor adapted to coact with said first named ribs to form fluid flow lines in the shape of an elongated loop depressed intermediate its ends.

REMARKS

The citations of record have been very carefully reviewed with particular attention to the patent granted to Willis, No. 180299, and it is thought that the specific embodiment of applicant's invention as brought out in greater detail by the herewith submitted amendment overcomes the objections heretofore brought to the case.

The paragraphs and sentences herewith inserted in the specification, and particularly brought out in the claims upon the subject matter originally specified, bring forth the various functions and construction of the parts of applicant's invention.

It is earnestly solicited that an early and

favorable action be granted upon this case. 891

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Paper No. 4

REJECTION, Mar. 10, 1917:

In response to the amendment of Feb. 21, 1917.

The claims are rejected in view of the following patents:

Cooper	Apr. 23, 1872	126,030	68-24
Hoffman	Aug. 9, 1881	245,300	68-24

Both show ribs beveled at their inner ends. Cooper shows an inverted bowl, and Hoffman shows ribs of different length as disclosed by applicant.

JCS J. H. Lightfoot, Exr. Div. 25

-----:-----

Paper No. 5

AMENDMENT B, Aug. 9, 1917:

Replying to Office letter of March 10, 1917, the principle Examiner is reminded of the interview had with him on August 6th at which time the references cited were thoroughly discussed. As pointed out to the Examiner the action of the apparatus in the present case differs materially from the action of the patented structures. In applicant's device the disk 2 is a float resting on the surface of the water and not necessarily contacting with clothes. This float is rotated and the vanes or ribs set up a centrifugal action which causes the upper portion of the water in the tub to flow outwardly against the wall of the tub and thence downwardly and inwardly, the water rising at the center under the space provided between

122

the inner ends of the vanes. In all of the references the upper disk constitutes a fabric rubbing element and does not set up a centrifugal action as in the present case. In view of the foregoing and other facts submitted in the course of the interview referred to and, as suggested by the primary Examiner, the following amendment is made:

Claims cancelled and the following substituted:

B' Patented claim without change.

R E M A R K S

It is thought that the claim presented herewith should be allowed and favorable action is urged.

-----:-----

ALLOWED AUG. 17, 1917

-----:-----

UNITED STATES DISTRICT COURT

WESTERN DISTRICT OF NEW YORK

Honorable Commissioner of Patents,

Washington, D. C.

Sir:

In compliance with the Act of February 18, 1922 (42 Stat. L.), you are advised that there was filed on the 11th day of February, 1926, in this court an action, suit, or proceeding No. 894-E, entitled:

Name THE NINETEEN HUNDRED WASHER COMPANY, Plaintiff,

Address Binghamton, New York

versus

Name AUTOMATIC DISTRIBUTING CORPORATION, Defendant

Address Niagara Falls, New York

brought upon the following patents:

PATENT NO.	DATE OF PATENT	PATENTEE
1. 1,240,826	Sept. 25, 1917	George L. Davis
2.		
3.		
4.		
5.		

In the above-entitled case, on the day of , 19 , the following patents have been included by (insert amendment, answer, cross bill, or other pleading):

PATENT NO.	DATE OF PATENT	PATENTEE
1.		
2.		
3.		
4.		
5.		

In the above-entitled case the following decision has been rendered or decree found:

IN WITNESS WHEREOF I have affixed my hand this eleventh day of February, 1926, at Buffalo, New York.

Harris A. Williams

Clerk of said Court

DISTRICT COURT OF THE UNITED STATES
WESTERN DISTRICT OF NEW YORK

Honorable Commissioner of Patents,
Washington, D. C.

Sir:

In compliance with the Act of February 18, 1922 (42 Stat. L. 392), you are advised that there was filed on the 11th day of February, 1926 in this court an action, suit, or proceeding No. 894-E, entitled

Name The Nineteen Hundred Washer Company, Plaintiff,
Address Binghamton, N. Y.

versus

Name Automatic Distributing Corporation, Defendant
Address Niagara Falls, N. Y.

brought upon the following patents:

PATENT NO.	DATE OF PATENT	PATENTEE
1. 1,240,826	Sept. 25, 1917	George I. Davis
2.		
3.		
4.		
5.		

In the above-entitled case, on the ..... day of ....., 19....
the following patents have been included by ..... (insert amendment, answer, cross bill, or other pleading):

PATENT NO.	DATE OF PATENT	PATENTEE
1.		
2.		
3.		
4.		
5.		

In the above-entitled case the following decision has been rendered or decree issued .....
Filed and entered order of dismissal January 10, 1928.

IN WITNESS WHEREOF I have affixed my hand this 24th day of January, 1928, at Buffalo, New York.

Harris S. Williams
Clerk of said Court.
by May C. Aickmon
Chief Deputy

1201

UNITED STATES PATENT OFFICE.

GEORGE L. DAVIS, OF BINGHAMTON, NEW YORK.

AGITATOR FOR WASHING-MACHINES.

1,240,826. Specification of Letters Patent. Patented Sept. 25, 1917.

Application filed February 29, 1916. Serial No. 81,269.

To all whom it may concern:

Be it known that I, GEORGE L. DAVIS, a citizen of the United States, residing at Binghamton, in the county of Broome and State of New York, have invented a new and useful Agitator for Washing-Machines, of which the following is a specification.

This invention relates to agitators for washing machines, the same being of the disk type designed for rotation back and forth within the tub of a washing machine.

One of the objects of the invention is to provide an agitator having a novel arrangement of ribs or vanes on the lower or active face thereof and which operate to direct the water outwardly by centrifugal force, thereby setting up a circulation downwardly within the tub adjacent the wall thereof, and thence upwardly through the fabrics in the tub and to the center of the space below the agitator.

A further object is to provide an agitator designed to float upon the water contained within the tub and the ribs on which will not only serve to set up a circulation of water as stated, but will also rub lightly upon the fabrics without danger of injuring them.

A still further object of my invention is to provide means in connection with the agitator disk to prevent churning of the washing fluid, and other means also in connection with said disk to cause the fluid flow lines to substantially conform to the shape of an elongated loop depressed intermediate its ends.

With the foregoing and other objects in view which will appear as the description proceeds, the invention resides in the combination and arrangement of parts and in the details of construction hereinafter described and claimed, it being understood that changes in the precise embodiment of the invention herein disclosed, can be made within the scope of what is claimed, without departing from the spirit of the invention.

In the accompanying drawings the preferred form of the invention has been shown.

In said drawings:—

Figure 1 is a view partly in side elevation and partly in section of a washing machine having the present improvements combined therewith.

Fig. 2 is a bottom plan view of the agitator.

Referring to the figures by characters of reference 1 designates a tub of the inverted type (of greater diameter at the bottom than at the top), and arranged within the tub so as to rotate backwardly and forwardly is a disk 2 which can be driven in any manner desired, as by means of a shaft 3 connected to a suitable motor, not shown. This disk is provided on its lower or active face with opposed alining ribs 4 having their inner ends beveled as at 5, while their outer ends are substantially flush with the margin of the disk 2. Arranged at opposed sides of the ribs 4 and groups of radiating ribs 6 regularly spaced and having their inner ends beveled as at 7 while their outer ends are substantially flush with the margin of the disk 2. The inner ends of these ribs 6 are arranged in the arc of a circle, while the opposed ribs 4 extend inwardly closer to the center of the disk and are somewhat wider than the ribs 6. Thus the inner ends of the ribs 4 act as blades for engaging liquid contained within the circle defined by the inner ends of the ribs 6. Because of this peculiar arrangement of ribs 4 and 6, the fluid is caused to flow in lines similar in shape to an elongated loop depressed intermediate its extremities. The constancy of such flow lines eliminates eddies and other current irregularities preventive of a high degree of efficiency. It will be apparent that all of the spaces formed between the ribs on the disk communicate adjacent the center of the disk between the inner ends of the ribs, and that the lower face of the disk is flat and free of obstructions or projections other than the ribs. The beveled inner terminals of ribs 4 and 6 indicate the substantial configuration of an inverted bowl presenting no acute obstructions to the fluid flow lines consequent of rib depression and centrifugal force.

In using the agitator the tub is partly filled with water, after which the disk 2 is placed above the fabrics in the tub so as to float upon the water. The disk is then rotated backwardly and forwardly and during this movement the ribs 4 and 6 will have two functions. First they will throw the upper portion of the water by centrifugal force toward the wall of the tub, thus creating a suction under the center of the disk, with the result that the water displaced upwardly by this suction will force its way through the fabrics and will create a circulation inwardly adjacent the bottom of the tub and downwardly adjacent the wall thereof.

Thus the fabrics will be thoroughly cleaned without being pulled and distorted, the circulation of the water through the fabrics resulting in the removal of the dirt therefrom. In addition to the foregoing the ribs will act as rubbing elements inasmuch as they will engage lightly with the fabrics thereunder.

As has heretofore been pointed out, importance is attached to the particular construction and arrangement of the ribs on the disk. With this arrangement the shorter ribs 6 operate to throw the water outwardly by centrifugal force, creating a suction into the central space between the inner ends of the ribs. The water brought into this central space is engaged and thrown outwardly by the inner ends of the ribs 4 so that the centrifugal action of the agitator is materially increased by this particular arrangement.

What is claimed is:—

In a washing machine the combination with a tub, of an agitating disk mounted to float on water in the tub, radial vanes upon the lower face of the disk adapted, when the disk is rotated, to direct the upper portion of the water outwardly by centrifugal force toward the wall of the tub and to draw water upwardly from the center of the bottom thereof, and a driving shaft for actuating the disk, said disk being freely movable vertically. B'

In testimony that I claim the foregoing as my own, I have hereto affixed my signature in the presence of two witnesses.

GEORGE L. DAVIS.

Witnesses:
Otto A. Braun,
A. B. Smith.

1253

G. L. DAVIS.

AGITATOR FOR WASHING MACHINES.

APPLICATION FILED FEB. 29, 1916.

1,240,826.

Patented Sept. 25, 1917.

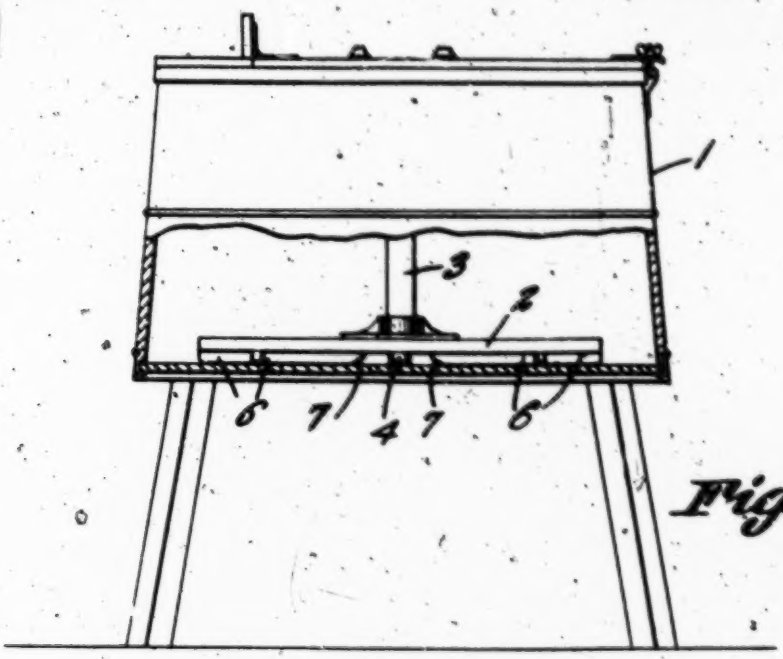


Fig. 1.

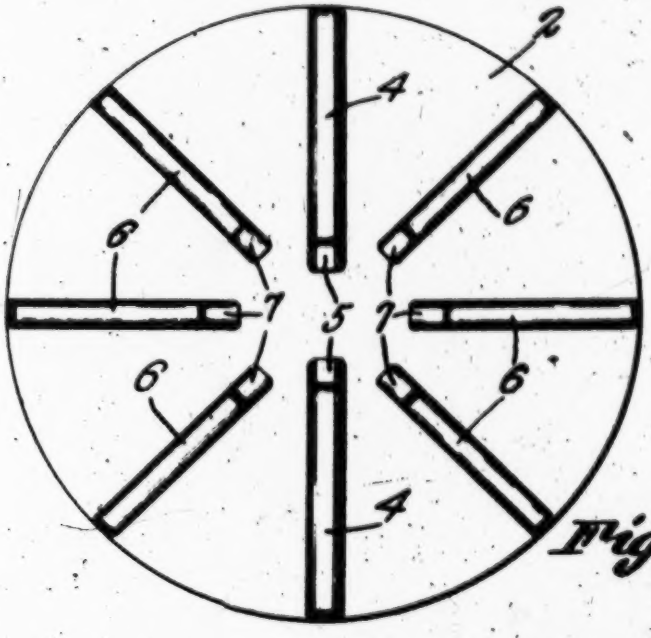


Fig. 2.

Witnesses

J. C. Fowler

R. L. Parker

G. L. Davis, Inventor

by C. A. Snow & Co.

Attorneys

1255 (Part of Plaintiff's Exhibit 36, Letters Patent No. 567,703 to G. R. Chestnut, September 15, 1896.)

906

(No Model.)

G. R. CHESNUT.

WASHING MACHINE.

No. 567,703. Patented Sept. 15, 1896.

Fig. 1.

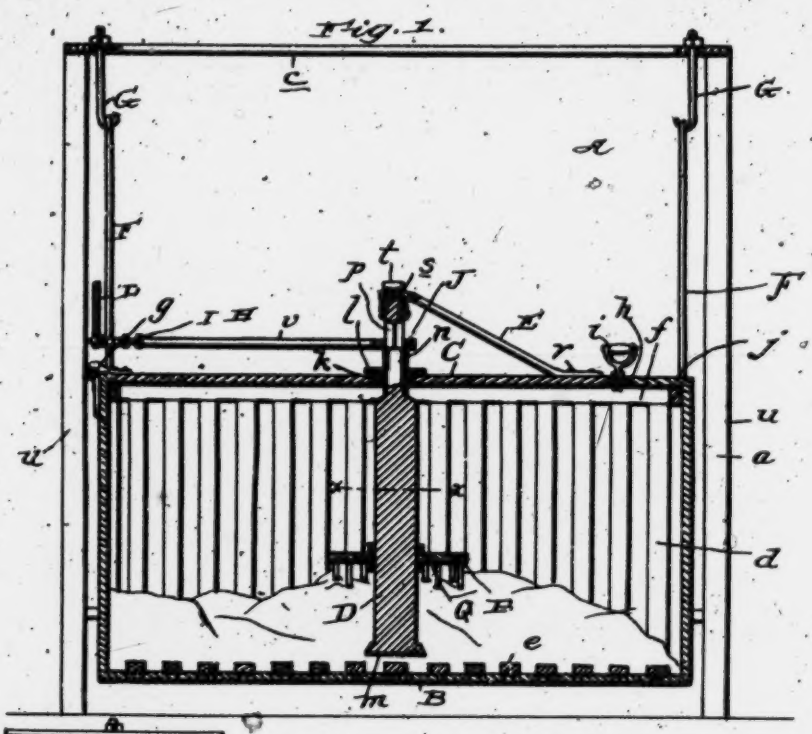


Fig. 2.

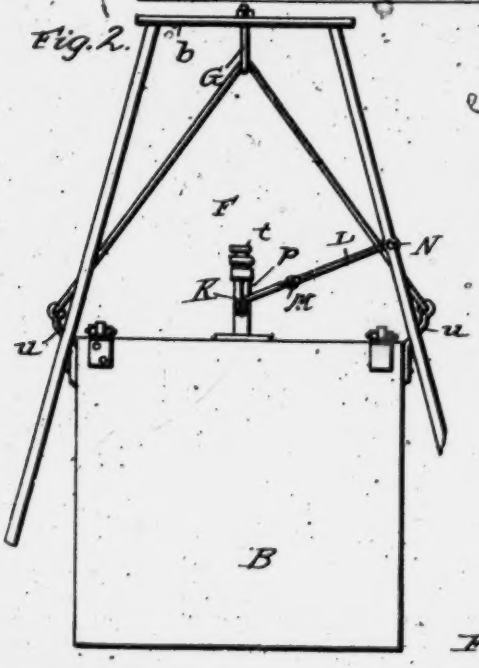


Fig. 3.

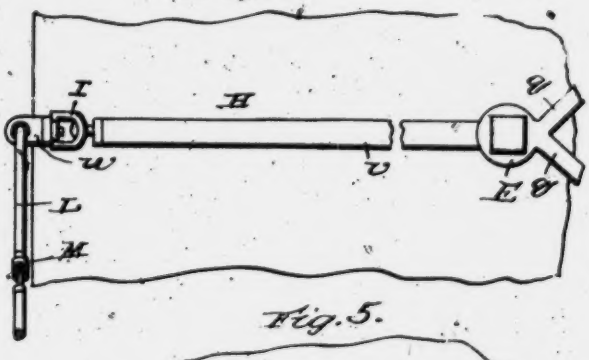


Fig. 5.

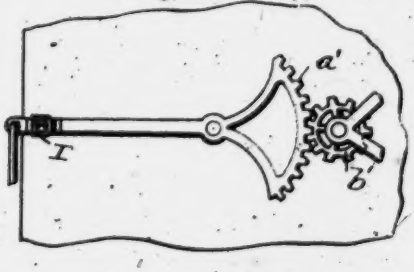
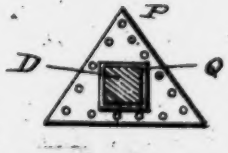


Fig. 4.



Witnesses
C. C. Linder
H. A. James.

Inventor
G. R. Chesnut.
By James J. Shuby
Attorney

UNITED STATES PATENT OFFICE.

GRANVILLE R. CHESNUT, OF SPIRIT LAKE, IOWA.

WASHING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 567,703, dated September 15, 1896.

Application filed March 17, 1896. Serial No. 583,616. (No model.)

To all whom it may concern:

Be it known that I, GRANVILLE R. CHESNUT, a citizen of the United States, residing at Spirit Lake, in the county of Dickinson and State of Iowa, have invented certain new and useful Improvements in Washing-Machines; and I do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to improvements in that class of washing-machines which embody swinging bodies; and it consists in the construction, novel combination, and adaptation of parts hereinafter described, and particularly pointed out in the claim appended.

In the annexed drawings, Figure 1 is a longitudinal sectional view of my improved machine. Fig. 2 is an end view with a part of the supporting-frame broken away. Fig. 3 is a plan view of the body removed from the frame, with parts broken away. Fig. 4 is a cross-sectional view of the agitator-shaft, taken at the point indicated by the dotted line x x on Fig. 1, looking downward; and Fig. 5 is a plan view of a modification, showing the same applied to a part of the tub or body top.

Referring by letter to said drawings, A indicates a frame. This frame is composed of suitable uprights a, which are arranged on inclines, so as to converge at their upper ends, and are connected in pairs by transversely-disposed horizontal bars b, and these transverse or cross bars are connected by a longitudinal bar c. This frame is designed to support the clothes-box, and it is obvious that it may be constructed in any suitable substantial manner to serve the purpose for which it is designed.

B indicates the clothes-box. This box is here shown as of an elongated rectangular form, having its entire inner walls corrugated. The corrugations I have shown as being formed by the employment of vertical strips d and horizontal strips e, which latter are secured to the floor of the box. At the tops of the vertical strips I provide strips f, upon which the cover may close, as shown in Fig. 1 of the drawings.

C indicates the cover. This cover is hinged to one of the end walls, as shown at g, and extends to the point h, where it may be provided with a suitable hand-grasp i for opening and closing the same, a horizontal strip j being provided, as shown, at the edge of the cover for the attachment of a wringer. The cover is provided with a central vertical aperture k, which may have a washer or metallic ring l for the passage of the agitator-shaft.

D indicates the agitator-shaft. This shaft is of an angular form in cross-section, and is expanded at its lower end, as shown at m, for a purpose which will presently appear. The shaft is rounded at n, where it passes through the cover, and above this rounded portion it is again made angular at p, and its upper end is adapted to receive a brace E. This brace, as partly shown in Fig. 3, has two branches q, which are secured to the cover by screws r or other suitable devices, and said brace has an eye s to receive the upper end of the shaft, which may be held thereto by any suitable means, there being a screw t shown in the present instance taking through the eye of the brace and into the top of the shaft.

The box is provided at each side near its ends with two straps or castings u, having eyes at their upper ends, and into these eyes are hooked the ends of a loop-wire F. This loop is suspended from hanger-rods G, which are hooked at their lower ends and screw-tapped at their upper ends. These upper ends are let through holes in the cross-bars b and receive nuts or other suitable fastening devices. It will thus be seen that the tub is suspended within the frame, and should it be desirable to raise or lower the tub it is simply necessary to manipulate the nuts on the upper ends of the hanger-rods.

H indicates a horizontal lever for oscillating the agitator-shaft. This lever is composed of an inner section v and an outer section w, united by a swivel-joint I. The inner section v is provided with an angular eye J to embrace the angular portion p of the agitator-shaft. The outer end of the outer section w is provided with an eye to receive a hook K on an operating-rod L. This rod L is also composed of two sections united by a swivel-joint M, and is connected at one end to one of the standards or uprights a of a supporting-frame, as shown at n. This connection may be made by a hook on one part

and an eye in the other to engage each other, although I do no not wish to be understood as limiting myself to such a construction. The swivel connection I between the sections *v w* of lever H is provided in order to enable this section *w* to turn with respect to the section *v* when the body is swung to and fro, and the swivel connection M between the two sections of the rod L is provided in order to enable the inner section to turn with respect to the outer section when the cover C is raised upon its hinges, so as not to interfere with such raising of the cover.

P indicates the agitator-head. This head may be of any suitable shape in outline, the preferred shape being triangular, and is provided with a central angular aperture Q to receive the agitator-shaft. This head, which is designed to play loosely on said shaft, is provided on its under side with depending-pins of varying lengths, as shown. The head is designed to float upon the shaft when water is placed in the box, and is prevented from leaving the shaft by the provision of the expanded portion *m*.

In operation the box is swung, which will cause the agitator-shaft and its head, which is in contact with the clothes in the box, to be oscillated through the medium of the lever H and the rod L. The clothes and water can be conveniently placed in the box when the cover has been raised, and when thus raised a wringer of any suitable construction can be applied to the strip *j* and operated in the usual manner. A cock may be provided for drawing off the suds water.

As a modification of the invention, I would dispense with the angular aperture in the lever H and provide said lever with a segmental rack *a'* at its inner end, and I would provide the agitator-shaft with a toothed pinion *b'* to engage the same. It will be seen that the other parts of the machines remain the same, and the operation performed in substantially the same way.

I am aware that a churn box or body can be conveniently substituted for the clothes or suds box when it is desired to use the machine as a churn, and I reserve the right to make such change or substitution as may fairly fall in the scope of my invention.

In some cases I might dispense with the joints in the lever H, and when this is done a large eye should be provided in the outer end of the outer section, so as to allow considerable play and permit the cover to be raised.

Having described my invention, what I claim is—

The washing-machine described comprising essentially the main frame, the swinging body or box hung from the main frame, the cover connected in a hinged manner to one end of the body or box, an oscillating shaft arranged in the body or box and carrying a dasher and having its upper portion journaled in and extending above the cover, the lever connected with the oscillatory shaft and comprising loosely-connected sections, and the rod L, disposed at right-angles to the lever and arranged above the hinged end of the cover and having an inner section connected to the outer section of the lever, an outer section connected to the main frame and the swivel connection M, between said inner and outer sections, substantially as and for the purpose set forth.

In testimony whereof I affix my signature in presence of two witnesses.

GRANVILLE R. CHESNUT.

Witnesses:

A. M. JOHNSON,

R. SPIRBECK.

1259 (Part of Plaintiff's Exhibit 36, Letters Patent No. 289,615 to E. W. Bush, December 4, 1883.)

(No Model.)

E. W. BUSH.

WASHING MACHINE.

No. 289,615. Patented Dec. 4, 1883.

Fig. 1.

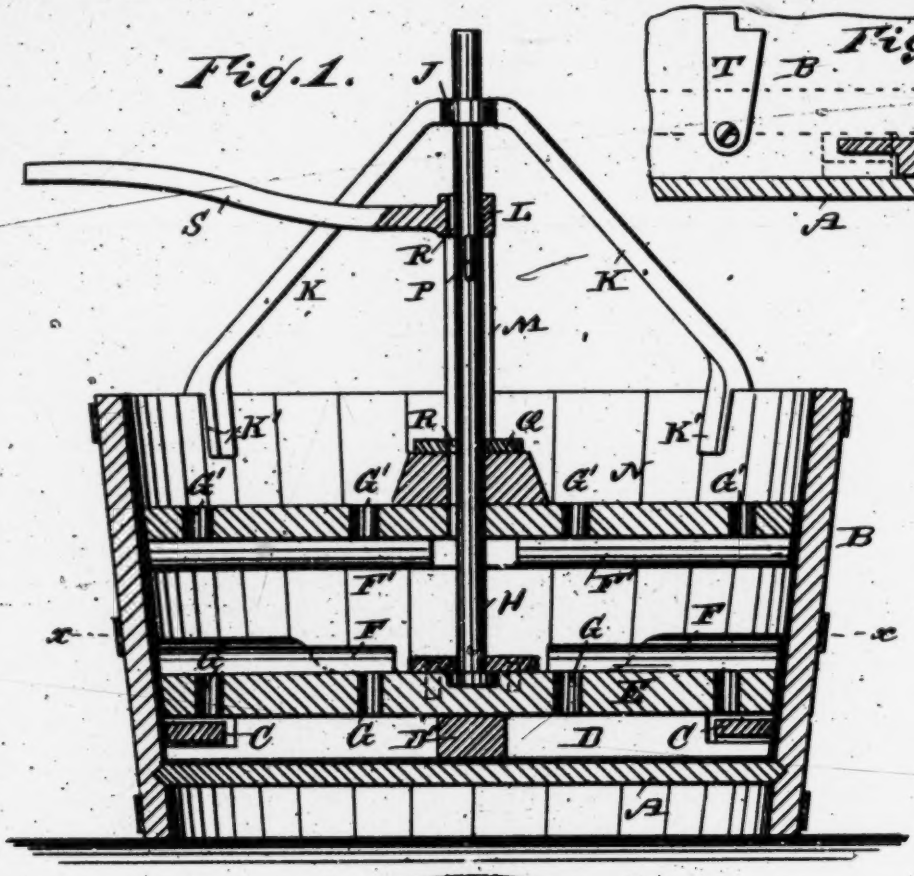


Fig. 3.

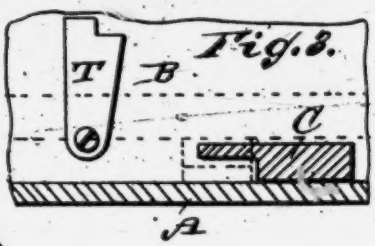
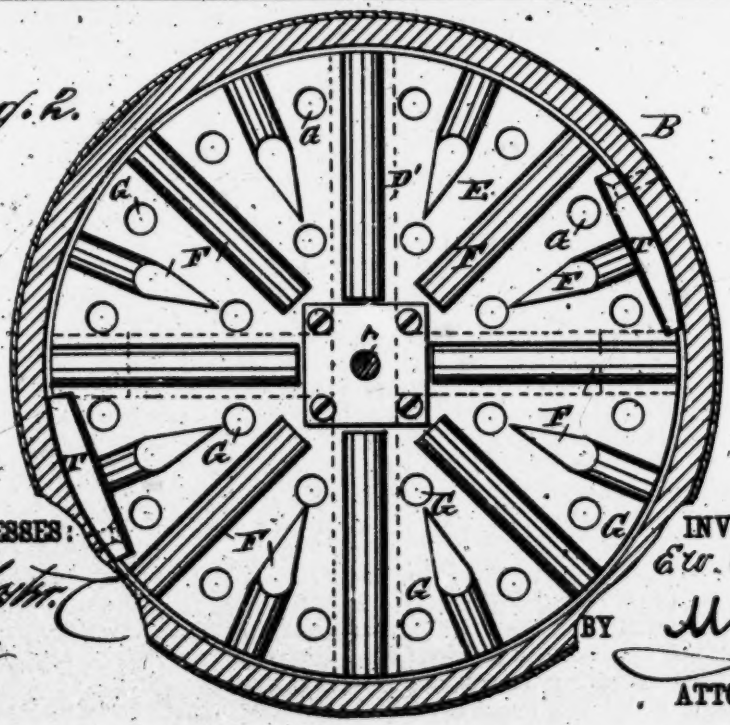


Fig. 2.



WITNESSES:

Chas. J. Foster.

L. Sedgwick

INVENTOR:

E. W. Bush

BY Munn & Co

ATTORNEYS.

UNITED STATES PATENT OFFICE.

EDWARD W. BUSH, OF ARMSTRONG, MISSOURI.

WASHING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 289,615, dated December 4, 1883.

Application filed April 27, 1883. (No model.)

To all whom it may concern:

Be it known that I, EDWARD WALTER BUSH, of Armstrong, in the county of Howard and State of Missouri, have invented a new and Improved Washing-Machine, of which the following is a full, clear, and exact description.

The object of the invention is to produce such combinations of parts as will facilitate the application of rubbing devices to an ordinary wash-tub. This combination will first be described in connection with the drawings, and all else which is necessary to a full understanding of the invention, and then pointed out in the claim.

Reference is to be had to the accompanying drawings, forming part of this specification, in which similar letters of reference indicate corresponding parts in all the figures.

Figure 1 is a cross-sectional elevation of my improved washing-machine. Fig. 2 is a sectional plan view of the same on the line *x x*, Fig. 1. Fig. 3 is a detail elevation and sectional view of the device for holding the false bottom in the tub.

On the upper surface of the bottom A of a wash-tub, B, of the usual construction, two cleats, C, are fastened, under the projecting parts of which the rabbeted end of a cross-bar, D, of a frame, D′, can be passed, which frame is to rest on the bottom of the tub, and is held in place by the cleats. On the frame D′ a false bottom, E, is fastened, which fits closely in the tub, and is provided on its upper surface with a series of radial ribs or ridges, F, of different lengths. Between the ridges the false bottom E is provided with numerous apertures, G. On the middle of the false bottom E an upwardly-projecting rod, H, is fastened, the upper end of which passes loosely through an eye, J, formed at the upper united ends of two braces, K, provided at their lower ends with forks K′, adapted to be passed on the upper edge of the tub. The upper end of the rod is thus held so that it will always remain vertical. A sleeve, L, surrounding the rod H, is formed on the upper united ends of two arms, M, having their lower ends secured to the upper surface of a revolving disk, N, fitting in the tub, and provided on its under surface with radial ridges F′, like the ridges F of false bottom E. The rotating rubbing-disk N is provided with numerous apertures, G′. The rod H is provided with a longitudinal feather or spline, P, and the collar or sleeve L, and a washer, Q, on the upper surface of the disk N, and the disk are provided with vertical grooves R, through which the said spline can pass. The collar or sleeve L is provided with a handle, S. On the inner side of the tub latches T are pivoted, which can be passed into recesses in the edges of the false bottom to lock the same in place and prevent the same from turning.

The operation is as follows: The clothes to be washed are spread evenly on the false bottom E, and the disk N is lowered on the clothes, the tub is partly filled with water, and the disk N is rocked to and fro in the horizontal plane by means of the handle S, whereby the clothes will be thoroughly rubbed and washed. The dirt washed from the clothes passes, with the heavy dirty water, through the apertures G in the false bottom E, and collects in the bottom A below the false bottom, and cannot again mix with the water, so that the suds will be cleaned for receiving the next tub-full of clothes. The disk N is held on the clothes by turning the collar L in such a manner that the spline P can pass up through the groove R in the collar. The upper edge of the collar will then be below the lower end of the spline, and if the collar is turned the spline prevents it from rising. Care must be taken not to turn the collar to such an extent that the spline can pass through the groove R. In a like manner the collar can be held above the spline. If the disk N, (the braces K having been previously removed from the tub B and shaft P, when the collar L is grasped by the hand, and by pulling upward thereon the said disk, with its adjunctive parts, is lifted out of the tub off the shaft H,) is to be removed, the same and the collar L are turned until the spline P can pass through the slots R in the collar and in the washer Q.

After the machine has been used, all parts can be easily and rapidly taken from the tub, which can then be cleaned thoroughly.

The confined air can escape through the apertures G′ in the rubbing-disk, thus allowing the weight of the disk to press more forcibly on the clothes.

I am aware that ribbed rubbers—one rocking or rotary and the other stationary—are very old in washing-machines; also, that they have been perforated, and the lower one made to form a false bottom elevated above the true bottom of the tub; but

What I do claim as new and of my invention is—

In a washing-machine, the combination, with a wash-tub, of a stationary rubber or false bottom, E, having a central rod, H, with spline P, and a rocking rubber having the collar L, with groove R, whereby the rocking rubber may be held at the desired distance above the stationary one, as described.

EDWARD W. BUSH.

Witnesses:

JOSEPH B. FUGATE,

J. T. HUME.

1262 (Part of Plaintiff's Exhibit 36, Letters Patent No. 245,300 to A. Hoffmann, August 9, 1881.)

(No Model.)

914

A. HOFFMANN.

WASHING MACHINE.

No. 245,300. Patented Aug. 9, 1881.

Fig. 1.

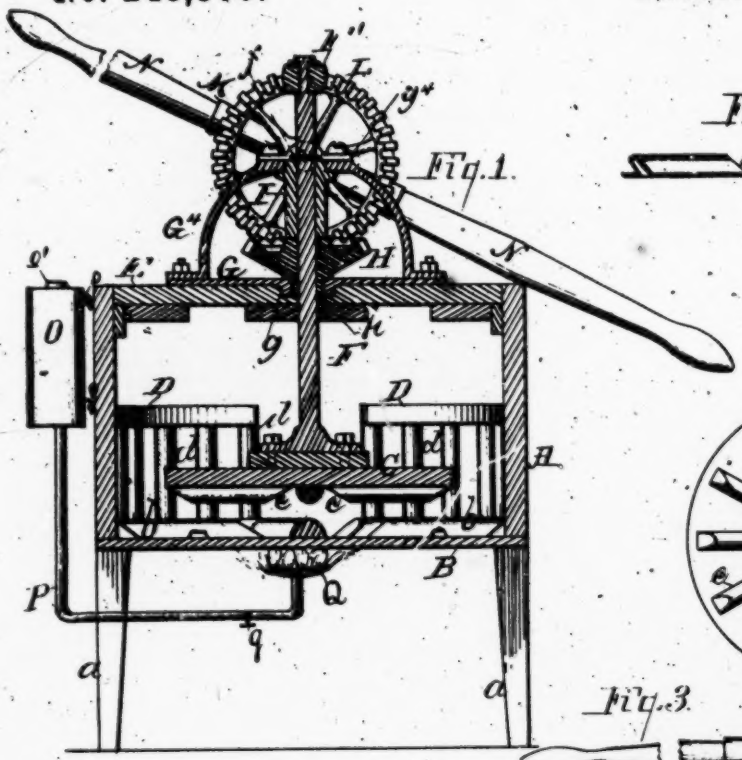


Fig. 5.

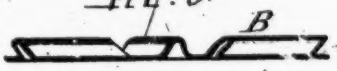


Fig. 4.

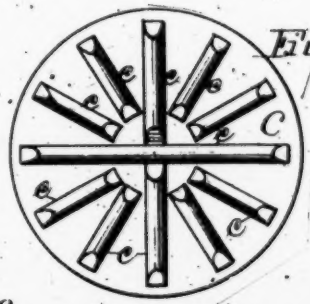


Fig. 2.

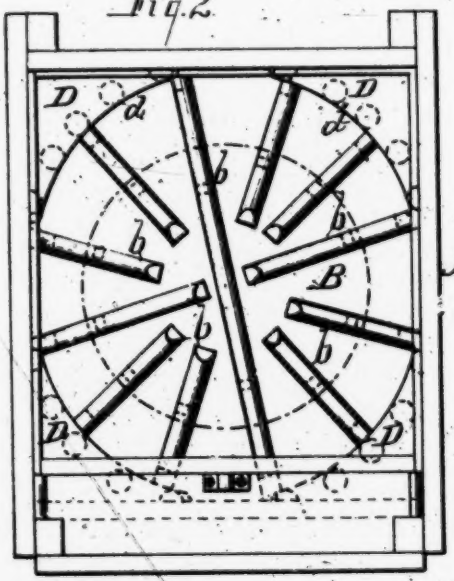
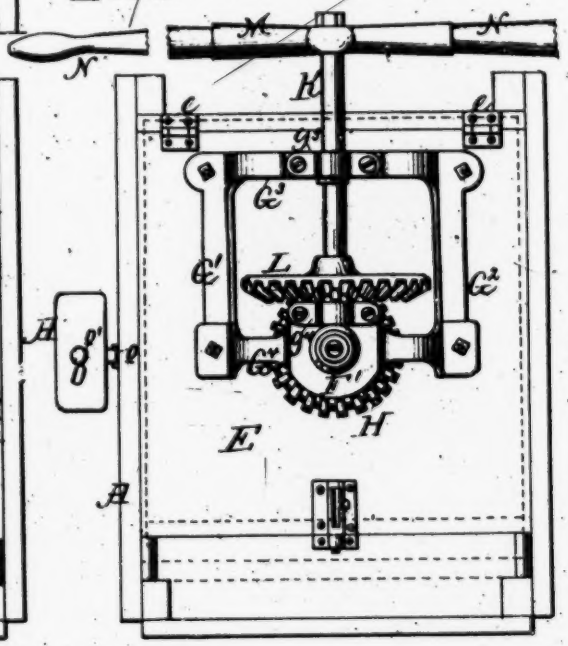


Fig. 3.



Witnesses.
E. G. Asmus
J. B. Peck

Inventor:
Adolph Hoffmann
by Stout & Underwood
Attorneys

UNITED STATES PATENT OFFICE.

ADOLPH HOFFMANN, OF MILWAUKEE, WISCONSIN.

WASHING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 245,300, dated August 9, 1881.

Application filed May 11, 1881. (No model.)

To all whom it may concern:

Be it known that I, ADOLPH HOFFMANN, of Milwaukee, in the county of Milwaukee, and in the State of Wisconsin, have invented certain new and useful Improvements in Washing-Machines; and I do hereby declare that the following is a full, clear, and exact description thereof.

My invention consists of a new and improved washing-machine, together with certain improvements in the gearing and in the means for heating the suds in the box, all as more fully set forth hereinafter.

In the drawings, Figure 1 represents the entire machine, in vertical cross-section, and with the heating device attached thereto. Fig. 2 is a plan view of the wash-box with the cover and the operating mechanism connected therewith removed. Fig. 3 is a plan view of the entire machine, and Figs. 4 and 5 are details.

The wash-box A, preferably oblong in shape, is made in the ordinary manner, with the exception of the bottom B, which I prefer to make of metal, while the balance of the wash-box is ordinarily made of wood, although all may be made of metal, or such parts as are made of wood may be lined or covered with metal, as desired. This bottom B may be either cast solid and galvanized, as shown in Fig. 1, or pressed out of a stout sheet of zinc, as shown in Fig. 5, half-round ribs *b b* being formed upon its upper surface, arranged radially, as shown. The wash-box is elevated to a suitable height above the floor by legs *a a*, as usual, and inside the box each corner is filled with the sections D, consisting of upper and lower plates, having between them vertical round rods *d d*, arranged in the line of an ellipse over the oblong bottom. The said rods are arranged in the plate so as to be capable of revolution, and thus greatly assist in the cleansing of the materials to be washed.

E is the cover of the machine, hinged at *e e*, as shown. This cover supports the rubber C and the entire operating mechanism. The rubber C is made of a stout wooden disk provided on its under side with half-round ribs *c c*, corresponding to the ribs *b b* on the bottom of the wash-box.

To the rubber C is securely bolted the lower end of a straight shank, F, which is made square in cross-section, and moves in square bearings in the operating mechanism, but passes through a round hole in the cover to permit of the rubber C being freely revolved.

The cover E is recessed at its center to receive the downward projection *g* of the plate G, which projection is perforated to receive the hub *h* of the horizontal bevel-gear H, and this hub *h* is, in turn, pierced with a square hole to receive the squared shank F of the rubber C. The hub *h* extends upward above the level of the cogs on the gear, and serves as a support to the sleeve I, also perforated with a square hole fitting the squared shank F. The plate G has two flat plates, G′ and G^2, extending backward toward the hinged end of the cover, and united at their rear ends by the arched plate G^3, the whole device G G′ G^2 G^3 being preferably cast solid in one piece. Above and to the front plate, G, a second arched plate, G^4, is secured by bolts, the top of this arch being perforated and fitting over the sleeve I, resting on a shoulder formed on said sleeve, as clearly shown in Fig. 1. These two arched plates G^3 and G^4 serve to support the crank-shaft K, which carries the handle-sockets M at one end and the vertical bevel-gear L at the other, the crank-shaft being held in place over each arched plate by the caps g^3 and g^4 and bolts and nuts of ordinary construction.

The shank F is provided with a pin or projection, *f*, just above the top of the arched plate G^4, to keep the rubber C at a certain height above the bottom B of the wash-box when the machine is not in use, and to limit its downward play, and has a knob or handle, F′, to grasp in raising the shank when it is desired to open the cover. This handle F′ can be weighted, if desired; but I prefer to make the rubber C sufficiently heavy to bear with considerable pressure upon the mass of clothing beneath it. The wash-box is provided with a stop-cock of ordinary construction to draw off the suds and dirty water when the machine is to be emptied.

The operation of my device is extremely simple. In order to open the cover it is necessary to lift the rubber C to the top of the box by means of the shank-handle F′, when the cover (with the mechanism attached thereto) can be turned back on the hinges *e e*, and the water and soiled clothes put into the wash-box, the

cover replaced in proper position, and the rubber C reciprocated by operating the handles N of the machine, the rubber C and shank F rising to a height commensurate with the quantity of clothing in the wash-box, yet always bearing down with considerable pressure upon the clothing, as described.

Where hot water is poured into the wash-box my device will work equally well with a wooden bottom, (covered with zinc or not, as desired;) but for greater convenience I have designed the metal bottom first described to serve in this manner.

In many instances it is not convenient to boil water separately and pour it into the wash-box, nor to boil the clothes separately in a wash-boiler before washing them, and with a metal bottom this is unnecessary. I construct a simple reservoir, O, of sheet-tin or other suitable material, and attach it by hooks *o* to the top edge or side of the wash-box. From the bottom of this reservoir a pipe, P, extends down and under the wash-box, being bent at an angle, as shown, and terminating in a burner, Q, perforated in its top with a number of minute holes, and provided with a stop, *q*. A suitable fluid (such as naphtha or alcohol) is supplied to the reservoir through the mouth *o'*, (which is kept covered by an ordinary screw-cap,) and the pipe P is supplied with wicking or other suitable absorbent to prevent the liquid from being supplied too freely to the burner.

With this device cold water may be poured into the wash-box along with the soiled clothing and the burner lighted. In a very few minutes the water will boil in the wash-box, when the light can be extinguished and the reservoir, &c., unhooked from the wash-box and put away, to be again used whenever the water gets too cold to properly cleanse the clothing, or it may be used continuously during the process of washing, as is preferred.

I am aware that I am not the first to suspend a corrugated or ribbed rubber within a wash-box from the cover thereof and to operate the same by means of bevel-gearing and a crank-shaft supported by arched plates, and such I do not broadly claim; nor am I the first to provide washing-machines with corrugated metal bottoms; nor the first to attach a heating device to a washing-machine, whereby the suds may be boiled directly in the wash-box, and to such constructions broadly I lay no claim; but

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. The wash-box A, provided with metal bottom B, having half-round ribs, radially disposed, and corner-sections D, consisting of upper and lower plates, having vertical rods *d d*, adapted to revolve in their bearings, substantially as described.

2. The combination of the plate G with projection *g*, flat plates $G' G^2$, arched plates $G^3 G^4$, crank-shaft K, vertical bevel-gear L, horizontal bevel-gear H, with hub *h*, sleeve I, and squared shank F, as set forth.

3. The combination of the wash-box A, having four corner-sections D, consisting of upper and lower plates, with vertical revolving rollers between said plates, these rollers being arranged about the wash-box in the line of an ellipse, and half-round ribs radially disposed within said ellipse upon the bottom of the wash-box, with the circular rubber C, provided on its under surface with radially-disposed half-round ribs, and adapted to move vertically and in the line of a circle, as shown and described.

In testimony that I claim the foregoing I have hereunto set my hand this 28th day of April, 1881.

ADOLPH HOFFMANN.

Witnesses:
STANLEY S. STOUT,
HAROLD G. UNDERWOOD.

1265 (Part of Plaintiff's Exhibit 36, Letters Patent No. 180,299 to W. H. Willis, July 25, 1876.)

2 Sheets—Sheet 1.

W. H. WILLIS.

WASHING-MACHINE.

No. 180,299. Patented July 25, 1876

Fig. 1.

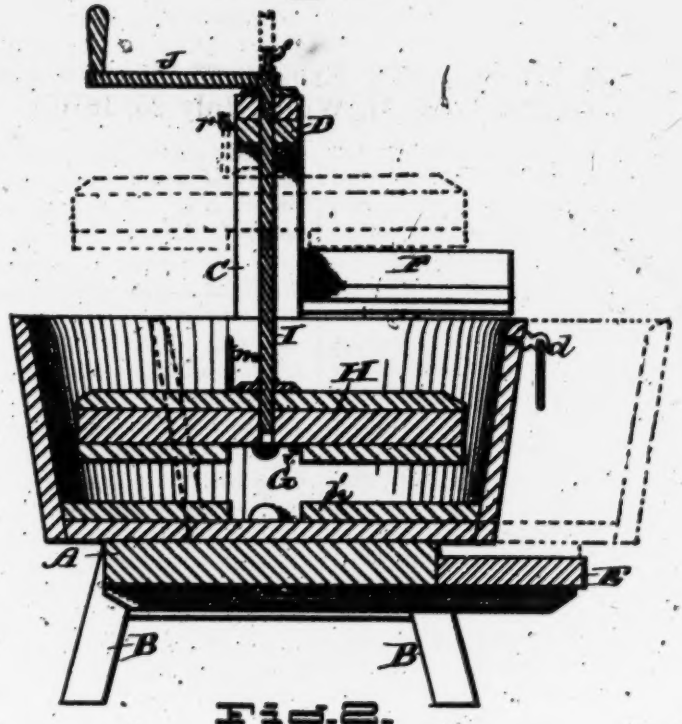
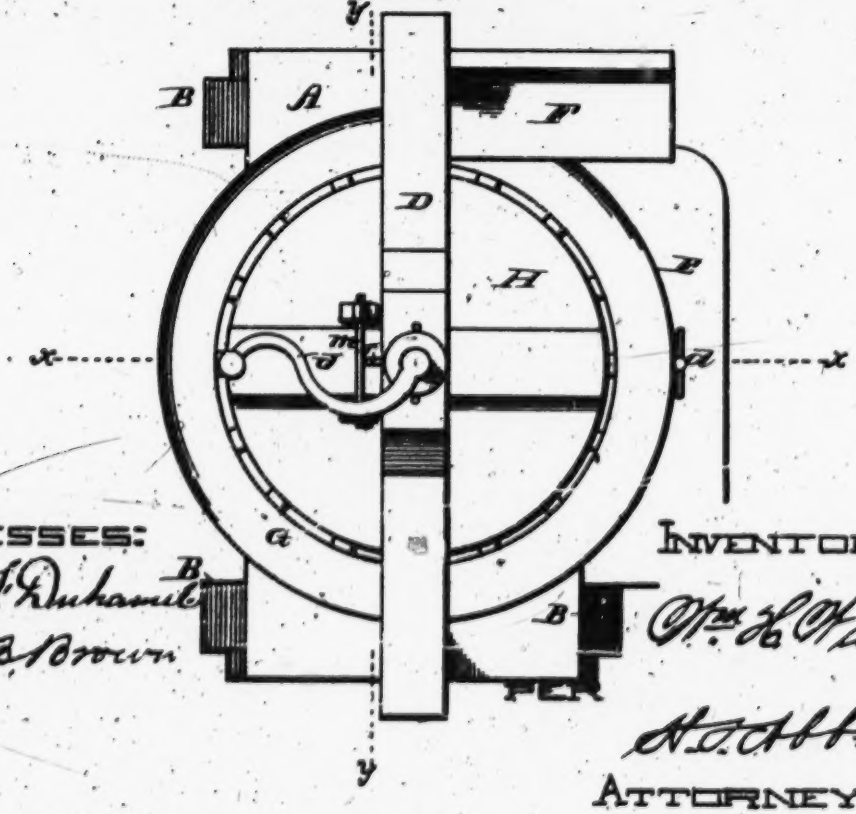


Fig. 2.



WITNESSES:

Jas. F. Duhamel

N. B. Brown

INVENTOR:

Wm. H. Willis.

N. C. Abbot.

ATTORNEY.

W. H. WILLIS.

WASHING-MACHINE.

No. 180,299. Patented July 25, 1876.

Fig. 3.

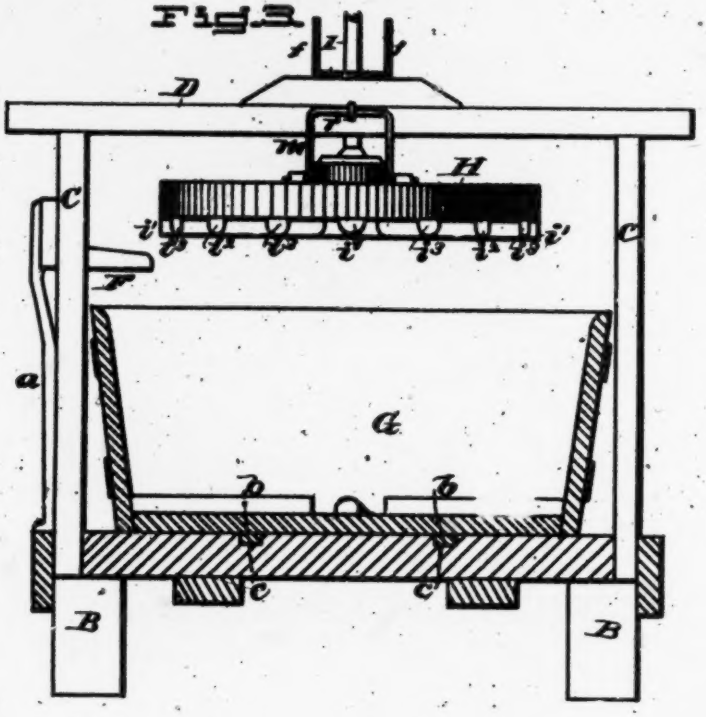
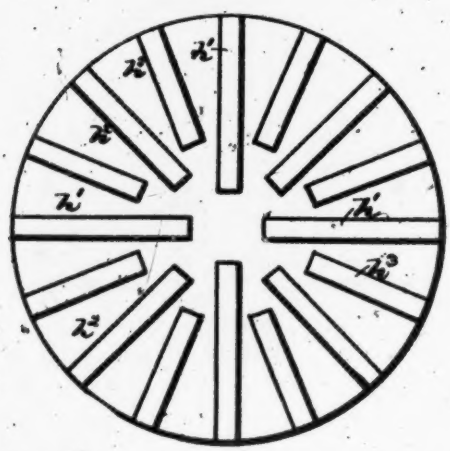


Fig. 4.



WITNESSES:

Jas. F. Duhamel.

W. B. Brown

INVENTOR

Wm. H. Willis.

PER

A. C. Abbot.

ATTORNEY.

UNITED STATES PATENT OFFICE.

WILLIAM H. WILLIS, OF FOREST CITY, MISSOURI.

IMPROVEMENT IN WASHING-MACHINES.

Specification forming part of Letters Patent No. **180,299**, dated July 25, 1876; application filed May 8, 1876.

To all whom it may concern:

Be it known that I, WM. H. WILLIS, of Forest City, in the county of Holt and State of Missouri, have invented certain new and useful Improvements in Washing-Machines, of which the following is a specification:

The nature of my invention consists in the construction and arrangement of a washing-machine, as will be hereinafter more fully set forth.

In order to enable others skilled in the art to which my invention appertains to make and use the same, I will now proceed to describe its construction and operation, referring to the annexed drawing, which forms a part of this specification, and in which—

Figure 1 is a sectional view taken on the line *x x* of Fig. 2. Fig. 2 is a plan view. Fig. 3 is a sectional view on the line *y y* of Fig. 2. Fig. 4 is a plan view of the rubber.

A represents the platform or bed of my machine, supported upon legs B B, and provided at each end with an upright standard, C, said standards being connected at the top by a cross-bar, D. Along the front side of the frame thus constructed is a platform, E, for the support of the tub when brought out from beneath the rubber while the clothes are being passed through the wringer. At one end of the frame I attach a wringer-board, F, to one of the standards C, the outer end of which is supported by the brace *a*. This board supports a wringer to be used after the clothes have been thoroughly rubbed.

Across the bed or platform A are two parallel transverse grooves, *c*, extending from the front edge to near the rear edge, to receive corresponding cleats *b b*, fastened under the bottom of the tub G, so that the tub will always be retained in proper position, and at the same time may be easily moved out or in, for which latter purpose it is provided on the front side with a handle, *d*.

On the bottom of the tub G are arranged ribs h^1, h^2, and h^3, in the following manner: Four ribs, h^1, are secured radially at equal distances apart, and extending from the sides of the tub to a suitable distance from the center, as shown. Between these ribs, midway, are secured four ribs, h^2, also radially, and from the sides inward; but these ribs are shorter than the ribs h^1. Eight still shorter ribs, h^3, are secured midway between the ribs h^1 and h^2, as shown.

Within the tub G works the circular rubber H, which is, on its under side, provided with ribs i^1 i^2 i^3, corresponding with and arranged in precisely the same manner as the ribs on the bottom of the tub. By this arrangement of the ribs the clothes, as the rubber turns first to one side and then to the other, are held just as if between the fingers of the hand, and rubbed first to one side and then to the other without any tearing or straining action.

The rubber H is secured to a vertical shaft, I, which passes up through the center of the top bar D, and has a crank, J, on its upper end. On each side of the shaft in the bar D is a pin, *f*, which limits the movement of the crank and of the rubber. On top of the rubber is a hinged bail, *m*, which is to catch on a hook, *r*, in the bar D when the rubber is elevated, so as to suspend the same while the tub is being moved out and in.

Having thus fully described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. The combination of the bed A, having transverse grooves *c c*, and the tub G, provided with the cleats *b b*, the rubber H, crank-shaft J, bar D, hinged bail *m*, and hook *r*, substantially as and for the purposes herein set forth.

2. The combination of the rubber H, crank-shaft I, bar D, hinged bail *m*, and hook *r*, substantially as and for the purposes herein set forth.

In testimony that I claim the foregoing as my own I affix my signature in presence of two witnesses.

WM. H. WILLIS.

Witnesses:
JAS. F. DU HAMEL,
DANIEL JOHNSON.

1268 (Part of Plaintiff's Exhibit 36, Letters Patent No. 126,030 to William Cooper, April 23, 1872.)

924

WILLIAM COOPER.

Improvement in Washing-Machines.

No. 126,030. Patented April 23, 1872.

Fig 1

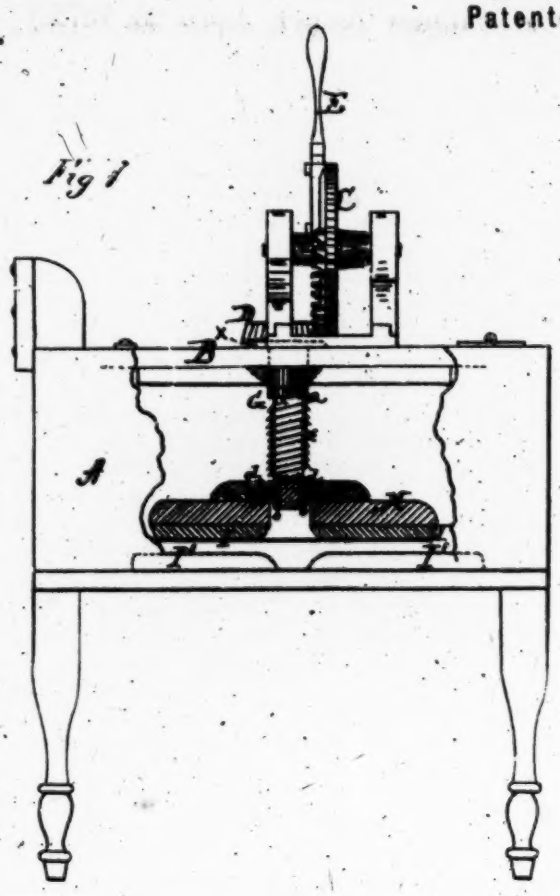


Fig 2

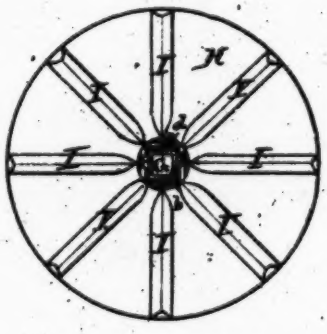
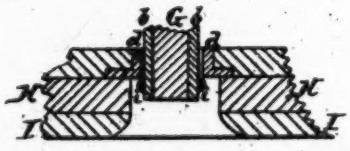


Fig 3



Witnesses:
Frank L. Durand
C. L. Event

Inventor
William Cooper
per Alexander Mason
Attorneys.

UNITED STATES PATENT OFFICE.

WILLIAM COOPER, OF YPSILANTI, MICHIGAN.

IMPROVEMENT IN WASHING-MACHINES.

Specification forming part of Letters Patent No. 126,030, dated April 23, 1872.

To all whom it may concern:

Be it known that I, WILLIAM COOPER, of Ypsilanti, in the county of Washtenaw and in the State of Michigan, have invented certain new and useful Improvements in Washing-Machines; and do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawing and to the letters of reference marked thereon making a part of this specification.

My present invention is intended as an improvement upon the washing-machine for which Letters Patent were granted to me November 3, 1868; and it consists particularly in the devices whereby the rub-board is kept on the shaft, as will be hereinafter more fully set forth.

In order to enable others skilled in the art to which my invention appertains to make and use the same, I will now proceed to describe its construction and operation, referring to the annexed drawing, in which—

Figure 1 is a side elevation, partly in section, of my improved washing-machine. Fig. 2 is a bottom view of the rub-board; and Fig. 3 is an enlarged section of the center of the rub-board.

A represents the washing-box, provided with a hinged lid, B, on top of which are suitable standards to contain the journals of the cog-wheel C. This wheel is operated back and forth by a lever, E, and gears with a pinion, D, attached to the upper end of a shaft, G, above the lid B, said shaft passing vertically downward into the box A. That part of the shaft G which passes through the lid B is round, while the balance is square, leaving a shoulder, *a*, on the shaft immediately below the lid. The entire shaft below this shoulder is, on all four sides, plated with plates *b b*, and near the lower end of said shaft, on two or more sides, are studs or projections *i i*. H represents the circular rub-board, provided with radiating beveled or V-shaped bars I I on its under side. The plated shaft G passes through a hole in the center of the rub-board H, and a portion of this hole is provided with angular plates *d d*, fitting around the shaft close enough to allow the rub-board to move up and down on the same. The rub-board H is prevented from coming off of the shaft by the plates *d d* striking the studs or projections *i i*; and the board is pressed down by a coil-spring, *e*, surrounding the shaft G between the shoulder *a* and the board. The bottom of the box A is provided with radiating ribs or bars I′ corresponding with those on the rub-board.

Having thus fully described my invention, what I claim as new, and desire to secure by Letters Patent, is—

The combination of the shaft G with shoulder *a*, plates *b b*, studs *i i*, spring *e*, and board H with the lid of the box, provided with wheel D, washer *x*, and the wheel C, all as shown and described, and for the purposes set forth.

In testimony that I claim the foregoing I have hereunto set my hand this 28th day of February, 1872.

WM. COOPER.

Witnesses:
A. G. STARR,
S. W. PARSONS.

1270 (Plaintiff's Exhibit 37, Letters Patent No. 83,764 to W. Cooper, November 3, 1868.)

928

William Cooper.
Washing Machine

No. 83.764. Patented Nov 3. 1868.

Fig 1.

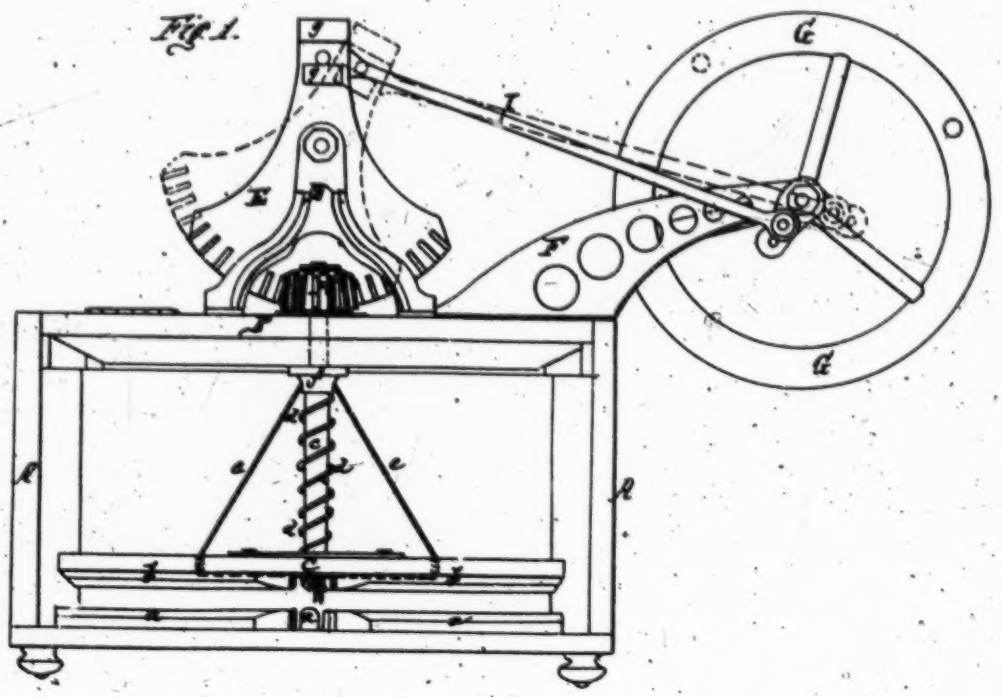
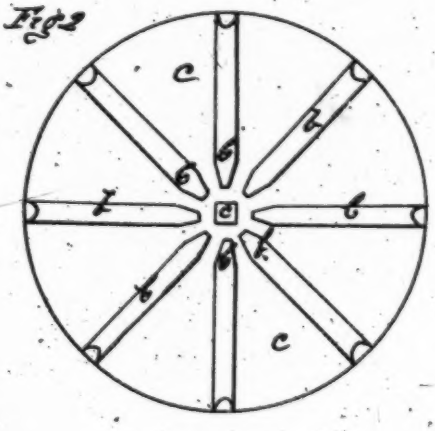


Fig 2



Witnesses
Henry Hing
Leopold Quirk

Inventor
William Cooper
per Alexander Wilson
Atty

United States Patent Office.

WILLIAM COOPER, OF GALESBURG, ILLINOIS.

Letters Patent No. 83,764, *dated November* 3, 1868.

IMPROVED WASHING-MACHINE.

The Schedule referred to in these Letters Patent and making part of the same.

To all whom it may concern:

Be it known that I, WILLIAM COOPER, of Galesburg, in the county of KNOX, and in the State of Illinois, have invented certain new and useful Improvements in Washing-Machines; and do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, and to the letters of reference marked thereon.

The nature of my invention consists in the construction and general arrangement of a washing-machine, to be operated either by means of a lever or a balance-wheel, as may be desired.

In order to enable others skilled in the art to make and use my invention, I will now proceed to describe its construction and operation, referring to the annexed drawings, which form a part of this specification, and in which—

Figure 1 is a side section, and

Figure 2, a bottom view of the circular movable board.

A represents a square box, made of any size and material desired, and having a hinged lid or cover, B.

Inside of said box is the rubber, formed by wooden cleats *a a*, fastened in circular form to the bottom thereof, and on which works a circular board, C, with cleats *b b* corresponding to those on the bottom, as shown in fig. 2.

The circular board C is attached to a shaft, *c*, by means of a small chain, *e e*, passing through a hole in said shaft, the ends of the chain being fastened to the board, to which is also attached a spiral spring, *d*, which is placed around the shaft *c*, and against a collar, *f*, on said shaft, so that the board C will always be pressed down on the clothes, but still have opportunity to accommodate itself to their movements on the cleats in the bottom of the box.

The shaft *c* passes through the lid or cover B, and at its upper end is a bevelled pinion, H, which is driven by a segment, E, of a cog-wheel, this being pivoted in an iron frame, D, to the lid.

The segment E has two loops, *g g*, for a lever, one near the centre, and the other near the top. There is also attached to it a pitman, I, and crank-wheel G, which are removable, and thus enables the machine to be worked by either lever or crank.

I am aware that the several parts of the above-described invention, taken separately, are not new.

What I claim, is—

The arrangement of the box A, its bottom ribs, *a*, the board C, with ribs *b*, shaft *c*, spring *d*, cog H, segment E, pitman I, plate F, and balance-wheel G, all constructed and operated as herein set forth.

In testimony that I claim the foregoing, I have hereunto set my hand, this 9th day of June, 1868.

WM. COOPER.

Witnesses:

A. N. MARX,

LEOPOLD EVERT.

U. S. D. C. W. D. Mo. W. D.
THE MAYTAG COMPANY
vs.
GENERAL ELECTRIC SUPPLY CORPORATION
IN EQUITY 2892

U.S.D.C., W.D.Mo.W.D.
In Equity 2892
Plff's Ex. No. 9
Notary Public

VOSS BROS. MFG. CO. DAVENPORT-IOWA

Pf Exp 38

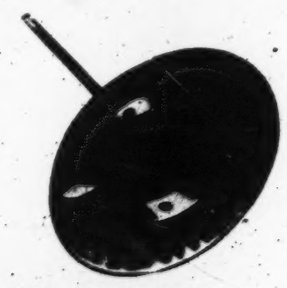
The Voss Dashers

The Peg Dasher The Peg Dasher, used on Voss PEG TYPE MACHINES, is made from selected hard wood, hand turned and polished. The dasher rod is square set in a metal flange and rigidly bolted through the dasher block. It extends through the lid and determines its position by the quantity of clothing in the wash. The weight of the complete dasher rests on top of washing at all times, insuring perfect and quick results.

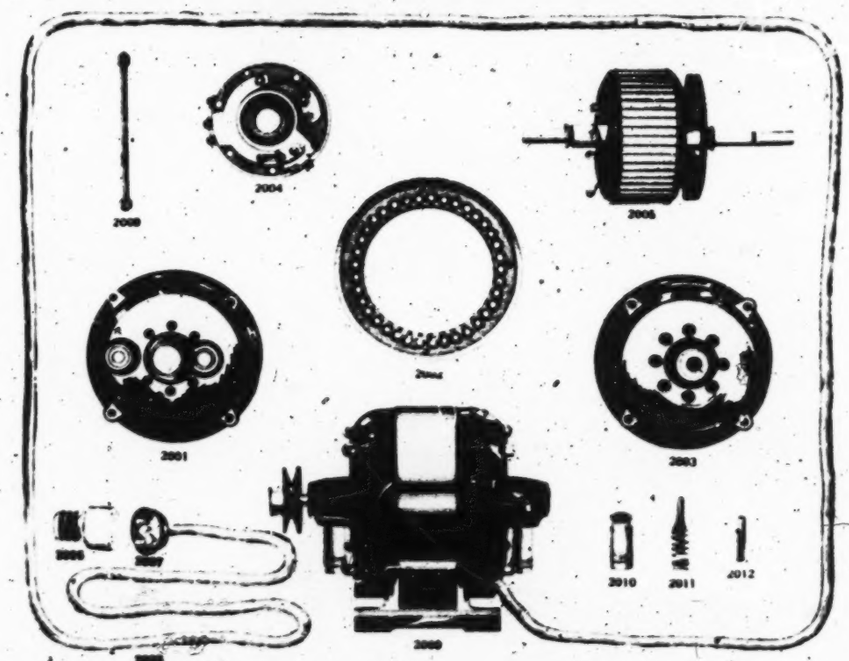
Disc or Flat Dasher The Disc or Flat Dasher, which can also be used on Voss PEG TYPE MACHINES if desired, is made from clear cypress with slats or corrugations on bottom ¾-inch thick, giving a perfect rubbing surface. The dasher is 16½ inches in diameter and there is a malleable iron flange 15 inches in length on the upper side, contributing ample weight and strength. The disc is perforated with six holes 1¼-inch in diameter to provide additional agitation and circulation. The top of the dasher rod is fitted with handle for raising complete dasher when opening lid. Like the peg dasher, the disc automatically adjusts itself to the size of the wash, always resting on top of the clothes.

The Vacuum Dasher The Vacuum Dasher, used on our Voss VACUUM MACHINES, is 12 inches in diameter. The outside shell is formed from one piece of iron, properly fluted or corrugated. The inside of the vacuum dasher is fitted with our auxiliary cup perforated and drawn from one piece of metal, affording additional strength and increased circulation. The inside of dasher is also equipped with three fingers or projections which materially assist in agitating the clothing. The copper valve with which this dasher is equipped receives air on the up stroke and automatically closes and expels hot air and steam through the wash on the down stroke. The dasher is galvanized after being assembled, hence there are no exposed parts to rust. It is extra large and strong, providing greater agitation than others. It draws no cold air from outside the tub to operate the valve, but takes the hot air from within the tub.

The wash water therefore remains hot much longer than if cold air were drawn from outside the tub.



VOSS BROS. MFG. CO. DAVENPORT-IOWA



ELECTRIC motors give satisfactory service in exact proportion to the care they receive. Motors must be kept free from moisture and water at all times. Oil cups must be kept filled with vaseline. Keep belt on driving pulley reasonably tight. When washing is finished and when oiling motor or machine, pull out the socket. Do not depend on the current being turned off by the switch.

No. 2000	Complete Motor	No. 2006	Attaching Plug.
No. 2001	End Shield.	No. 2007	
No. 2002	Laminations.	No. 2008	Cord.
No. 2003	End Shield.	No. 2009	Bolt.
No. 2004	Collector ring with switch.	No. 2010	Oil Cup.
No. 2005	Armature.	No. 2011	Wick with Spring.
		No. 2012	Brush.

THE QUALITY LINE OF WASHING MACHINES

U. S. D. C. W. D. Mo. W. D.

THE MAYTAG COMPANY

vs.

GENERAL ELECTRIC SUPPLY CORPORATION

IN EQUITY 2892

DEFENDANTS EXHIBIT 39

OUR Platform Washers with these valuable improvements, in addition to the many special features of convenience and safety already used, makes the "Voss Line" even more profitable to the dealer than heretofore, and merchants handling these Washers have only to display the machines properly to get the cream of the business.

We manufacture a complete line of

HAND,

POWER, and

ELECTRIC WASHERS

in the following types:

CONTINUOUS LEG STAVE,

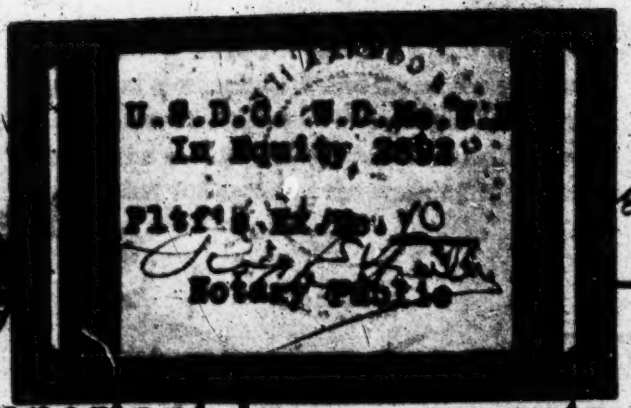
PLATFORM or BENCH, and

SWINGING WRINGER.

All Voss Washers are regularly equipped with peg type dashers, but we supply on special orders, disc or flat dashers, as shown on page 3 of this folder. All machines equipped with special dashers must be shipped from the factory, at Davenport, Iowa.

Voss Bros. Mfg. Co.

Davenport, Iowa

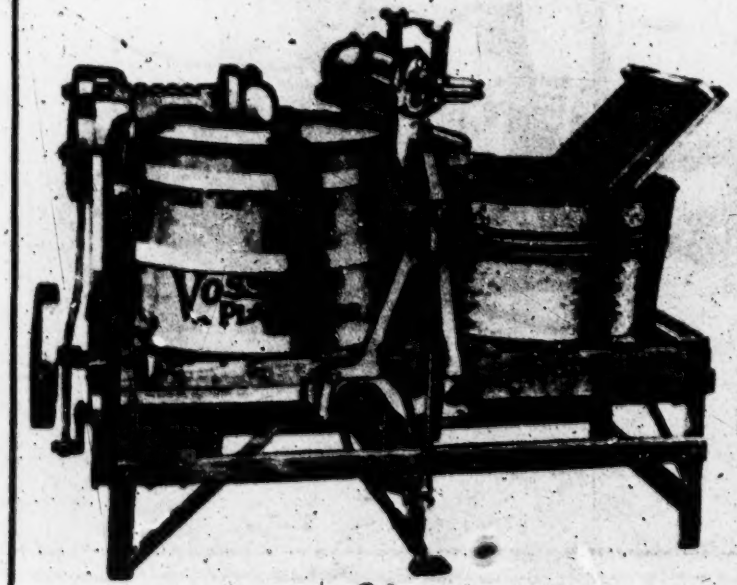


Important Improvements

- on -

Voss Platform Washers

G-1 and E-1



G-1

Length, 1 ft. 3 in. *Weight, crated, 250 lbs.*

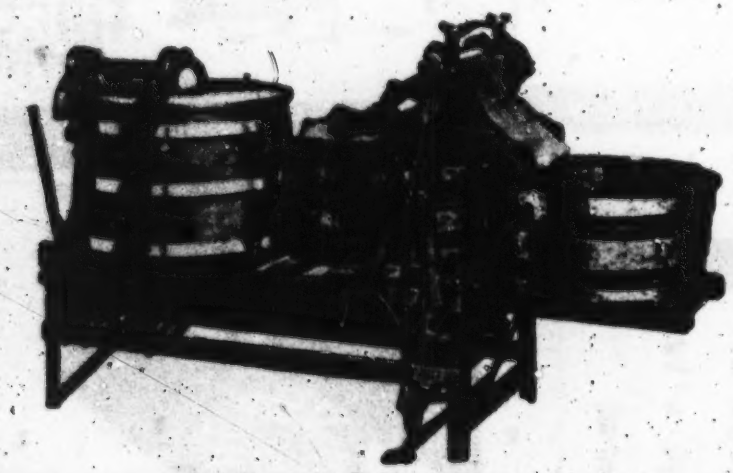
TO give the users greater capacity, more convenience and the maximum efficiency for the space occupied, we have made the following improvements on Platform Washers, Types G-1 and E-1.

PLAINTIFF'S EXHIBIT 39.

933

1ST.

Built the extended tray heavier and longer than heretofore so that it will receive and support a second tub instead of basket only, as previously built—giving tub capacity equal to any platform or swinging wringer machine.



G-1

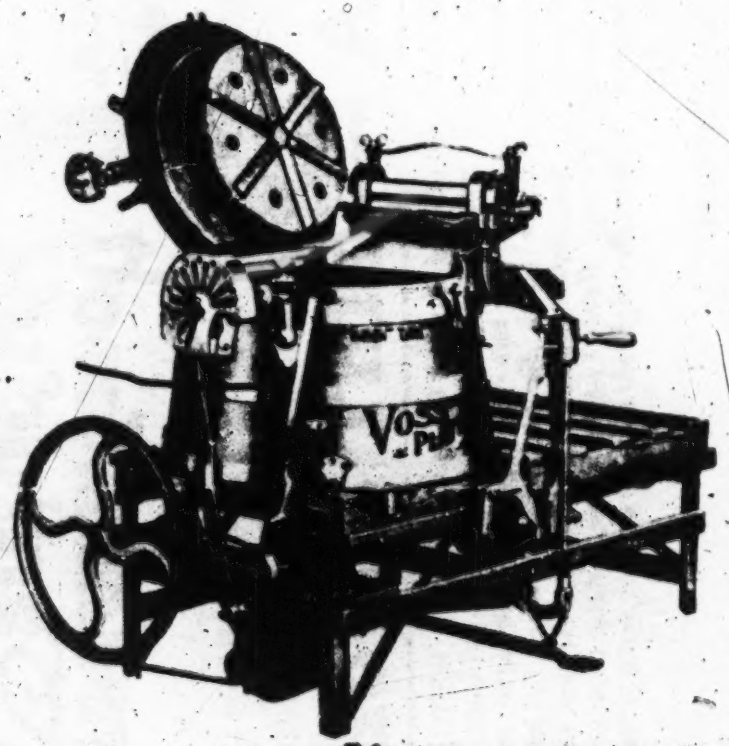
Length, 3 ft. 10 in. Weight, crated, 290 lbs.

2ND.

Equipped the wringer frame with a wood clothes chute and drain board so that clothes can be wrung from the rinse tub into the bluing tub or from bluing tub to rinse tub.

3RD.

Supplied a slatted wood tray which takes the place of clothes basket and fits on top of either metal tub to receive clothes when discharged from the wringer. This tray can also be used as basket for carrying the washing to clothes line.



E-1

Equipped with disc or flat dasher. Weight, crated, 320 lbs.

PLAINTIFF'S EXHIBIT 39.
935

U. S. D. C. W. D. Mo. W. D. PLAINTIFF'S EXHIBIT 40.

THE MAYTAG COMPANY 937

vs.

GENERAL ELECTRIC SUPPLY CORPORATION

IN EQUITY 2892

PLAINTIFF'S EXHIBIT 24

How's This — Any Better

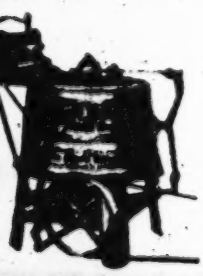
DOESN'T this beat the old-fashioned back-breaking washboard? Would you worry about washday if the rubbing and scrubbing were left out—if you could sit down while your heaviest clothes and your finest delicate laces were washed snowy clean? Well, that's exactly what you can do with the light-running "Sunshine" Washer. It makes washday one of the easiest days of the household. Best of all, its not a luxury for the few, but sold at a price within the reach of all. Your dealer to show you the "Sunshine" and explain to you why it is the easiest-working, longest-wearing and most efficient washer made.

Four Other Styles of Voss Washers

HERE are the other members of the Voss family of Washing Machines—all strictly high-grade each a little better at its price than your money buy of any other make. Ask your dealer for information.

OCEAN WAVE

old reliable—positively t Rotary Washer made. sands in use all over ica.

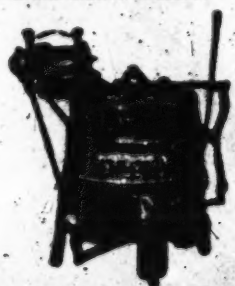


VERSAL POWER

be run by any kind of Wind, Electricity, Steam line Engine. Has power r attached. Wonderfully —and absolutely safe.

AUTOMATIC

The "Automatic" Washer is equipped with a disc dasher and a one piece metal wringer box. It operates easily and washes quickly. This is the ideal flat dasher Washer.



VOSS ELECTRIC

The Voss Electric Washer is a most complete and practical Electric Washing Machine, being equipped with a power-driven wringer controlled by either hand lever or foot treadle. The safest and most convenient Power Washer made.

PLY 24

Does Wash Day Rubbing

U.S.D.C. W.D.Mo.W.D.
In Equity 2892
Pltf's Ex. No. 24
Notary Public

PLAINTIFF'S EXHIBIT 40.

See The Sunshine Washer - TO-DAY! Its The Best Your Money Can Buy

THERE'S a lot of difference in washing machines—even if they all do look about the same at first glance. And those differences count big in time and labor and the life of the machine itself. Of course, the poorest of washers are a great deal better than none at all—but when you buy you might as well get your full money's worth. And that means—Get a Sunshine.

The "SUNSHINE" is the One Best Washer for You—BECAUSE:

1ST. It is one of the lightest and smoothest running machines made. Can be easily operated by a child. That's because it is perfectly balanced and runs on bicycle ball-bearings.

2ND. Will last for years. All metal parts are very simple and very strong. Nothing to get out of order. Tub is made of finest Louisiana Red Cypress, thoroughly seasoned. Not affected in any way by hot or cold water.

3RD. Is the only washer made with one-piece metal wringer box. This is a very important feature as wooden wringer boxes soon warp or crack, allowing water to leak all over the floor. The Sunshine wringer box is made of galvanized iron, and cannot leak, rust or wear out. Furthermore it is made round on the inside to fit the curves of the tub, giving a larger opening for putting in and taking out clothes.

4TH. The Sunshine Washer is equipped with the famous "Voss Visible Dasher" which adjusts itself automatically—works equally well whether the tub is full of clothes or contains but a single garment. And you'll readily see this is a mighty big advantage.

The Sunshine Washer is an unqualified success from every standpoint—the high-grade product of a manufacturer who is thoroughly reliable. See your dealer about the Sunshine today. After a trial of this tireless helper, you'll wonder why you haven't thrown that old back-breaking, clothes-tearing washboard on the scrap heap long ago.

Voss Bros. Mf'g. Co.
DAVENPORT, IOWA.

939

941

PLAINTIFF'S EXHIBIT 41.

U. S. D. C. W. D. Mo. W. D.

THE MAYTAG COMPANY

vs.

GENERAL ELECTRIC SUPPLY CORPORATION

IN EQUITY 2892

DEFENDANTS EXHIBIT 41

U.S.D.C. W.D.Mo.W.D.
In Equity 2892
Pltf's Ex No. 1
Notary Public

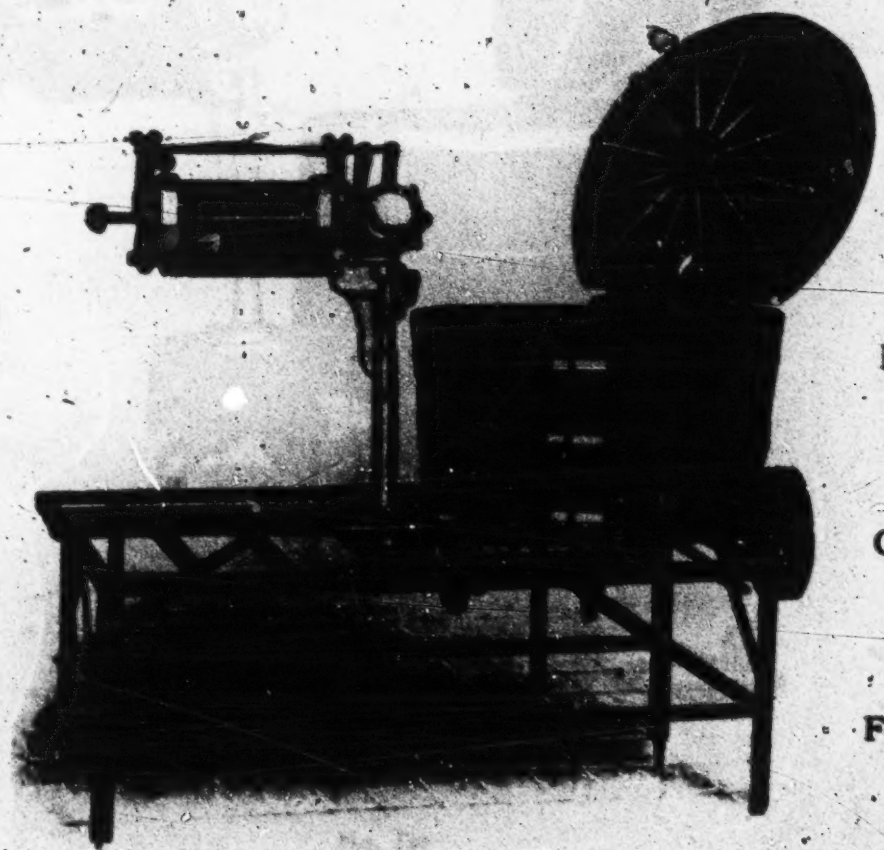
The Sterling Power Washer

With swinging reversible wringer
To be operated by gasoline engine or electric power

Steel Frame

Full length folding Extension Rack

Extra large detachable White Cedar Tub



Four Position Wringer

Large Reversible Water-board

Oscillating Tub Washer

Flat Disc — no pegs

SUPERIOR MACHINE COMPANY

Successors to Superior Mfg. Co.

STERLING, ILLINOIS

941

PLAINTIFF'S EXHIBIT 42.

U. S. D. C. W. D. Mo. W. D.

THE MAYTAG COMPANY, 943

vs.

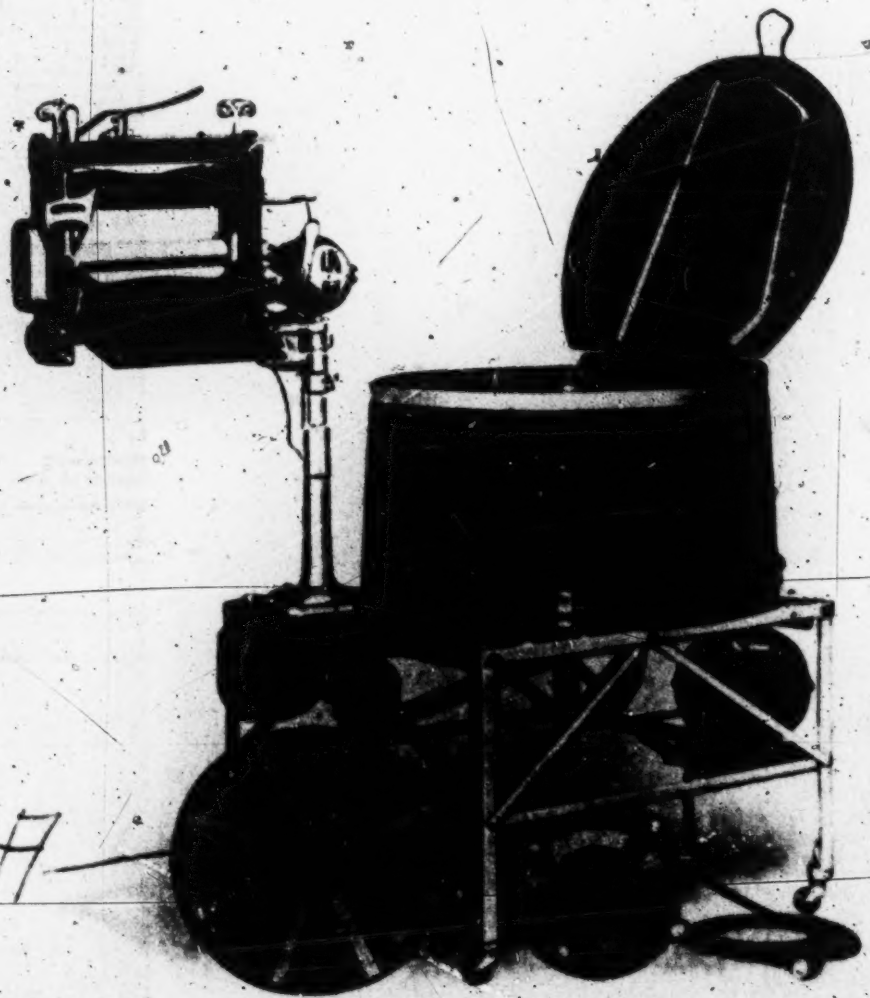
GENERAL ELECTRIC SUPPLY CORPORATION

IN EQUITY 2892

~~DEFENDANTS~~ EXHIBIT 1

U.S.D.C. W.D.Mo.W.D
In Equity 2892.
Pltf's Ex. No. 42
Notary Public

SUPERIOR MACHINE COMPANY, STERLING, ILLINOIS



No. D4

SUBMARINE ELECTRIC WASHER (SHORT BENCH)

U. S. D. C. W. D. Mo. W. D.

THE MAYTAG COMPANY

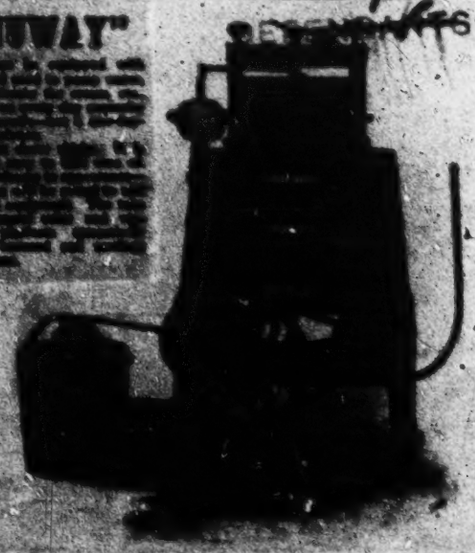
vs.

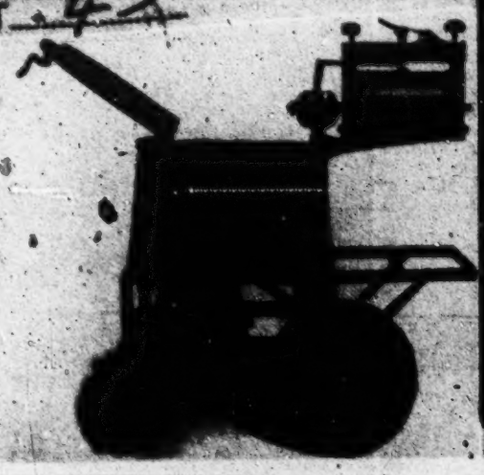
GENERAL ELECTRIC SUPPLY CORPORATION

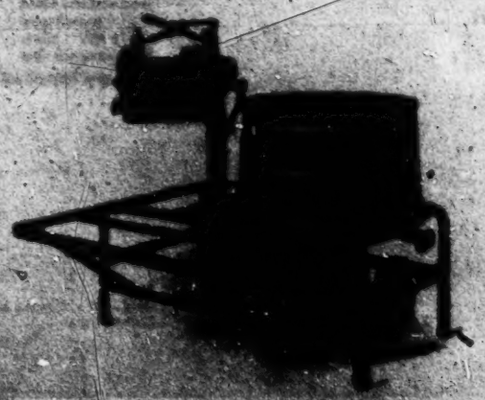
IN EQUITY 2892

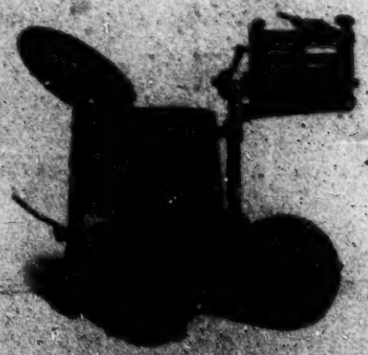
PLAINTIFF'S EXHIBIT 43.

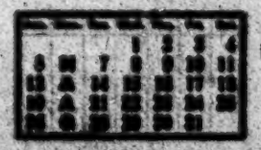
PLAINTIFF'S EXHIBIT 43.











THE MAYTAG COMPANY

vs.

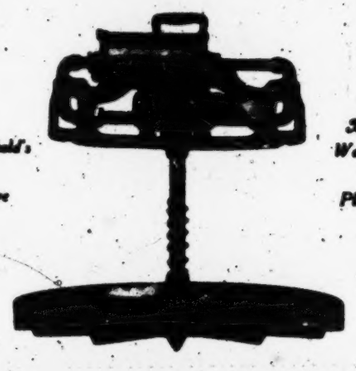
GENERAL ELECTRIC SUPPLY CORPORATION

IN EQUITY 2892

DEFENDANTS EXHIBIT 44

PLAINTIFF'S EXHIBIT 44.

The Motor is constructed on scientific principles, all working parts being made of the best quality of Steel Brass, thus preventing rust and corrosion, making a machine that will last a lifetime with ordinary use. The valves are located in a separate valve body. The cylinder being absolutely free from valves and springs allows the entire area of water, giving the efficiency of every drop that enters it, making the most powerful motor on the market. The Cylinder Heads and head on valve body have no gaskets as parts but are screwed up with a fine thread, preventing leaks.



The Household's Chief Treasure

Makes Washday a Pleasure

The Motor is placed on lid over center of tub so arranged that there will be no heavy weight to lift when opening washer, and is encased in a neatly finished frame which is fastened to the lid with two bolts. On account of the three ring floating valve used, our motor will start at any point and will not short stroke. The Dietz Motor consumes less water, and develops more power with less pressure than any other.

The Spring used to regulate the valves is made of Phosphor Bronze, and being encased and free from contact with the water will not break or loose its elasticity.

SUPERIOR POINTS *of* MERIT
in the
Dietz Power Washers

The Motor has no concealed springs, therefore is not liable to get out of order—has a floating valve, assisted by one external spring which does not come in contact with the water. This style valve is preferable to a complicated auxilary valve used in motors without springs or a slide valve which soon wears out on account of friction, and requires less pressure to operate it.

The Dasher Shaft has a long double bearing which prevents the dasher from wobbling. The DASHER has no Center Dasher Post which tangles and tears the clothes and DOES NOT FLOAT.

The Gear and Rack are completely shielded, which prevents the operator from being hurt

OUR GUARANTEE

Each motor is tested and inspected thuroughly before leaving our factory, and every one is guaranteed by us for one year against any defect in material or workmanship.

U.S.D.C. W.D.Mo.W.D
In Equity 2892
Plff's Ex. No. 18
Notary Public

THE FAMOUS DIETZ POWER WASHING MACHINES

Different from all others

NO INTERIOR SPRINGS and NO FLOATING DASHER

Pat. June 30, 1908.

Manufactured by THE JOHN DIETZ MFG. CO. CINCINNATI, OHIO

COMPARISON CREATES VALUES

WE INVITE COMPARISON

¶The most perfect power washer on the market. ¶Fully guaranteed and protected by patents. ¶Operated by ordinary water pressure—attach hose to faucet, turn on the water and the motor does the work.

SOLD BY DEALERS WHO SELL QUALITY.

THE DIETZ POWER WASHER

¶The accompanying cut shows an open view of our Pyrex machine. You will notice there is no rack or other projection through the center of the dasher, which tangles or tears the clothes. This is a very important feature and should be given consideration by every purchaser. Notice the large opening when lid is thrown open which makes inside of tub easily accessible.

THE DIETZ POWER WASHER

The dasher in the Dietz Power Washer does not float, but is locked to the end of a geared shaft which slides in a gear with a key way, thereby adjusting itself to the amount of clothes to be washed. A floating or collapsible dasher is uncontrollable, and therefore, when lid of machine is closed the dasher slides up under the lid where it remains. To properly wash clothes it is necessary to have the dasher amongst them, and this result cannot be obtained from a machine that has a dasher which floats. The Dietz Power Washer is the only machine on the market that has no floating dashers.

THE DIETZ RUBBOARD POWER WASHER

¶This machine is especially adapted for washing fine garments and laces, but can also be used for ordinary clothes. The tub is the same high quality as used in the Pyrex machine. The dasher in this machine, you will notice, is a large circular rubboard, covering the entire circumference of tub. It has large teeth which gently rub the clothes while carrying them through the water, the large holes

A Washer of Recognized Merit

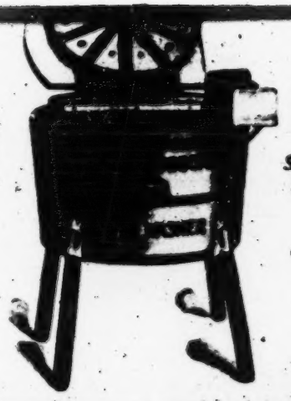
Used by People Who Know

No Complicated Connections to worry you —turn on water, the machine does the work

Hands Free for other Work while Machine is Washing

Insist on The Dieta there is none just as good.

A Machine of Quality!



Thousands of Satisfied Users.

Save your Health, Time, Strength and Clothes

The Wringer Attachment is the most approved type and admits the attachment of large size wringer. The outer machine is deeply corrugated on the inside like the surface of a washboard, which is very effective when used in conjunction with our style dasher.

The Tub is made of the best grade of Louisiana cypress, considered by scientists to be the best wood obtainable for tubs, tanks, etc.

Finish—Natural wood with two coats high grade varnish.

The handle at top of dasher stem is used to raise the dasher out of clothes when opening machine and to keep dasher up when closing machine to prevent crowding clothes to rear of tub.

The Dasher Shaft has a long double bearing which keeps the dasher rigid and in place, and prevents same from wobbling and scraping from side to side.

The Gear and Rack are completely shielded which prevents any possibility of operator being hurt.

The water from exhaust hose can be used for rinsing purposes

on dasher when forced upon the clothes cause a suction, forcing the hot soapy water through the fibers of the clothes. You do not have to push the clothes against the sides of the Dieta Power Washer to get results. The dasher is supposed to do the work and therefore should receive contact with the clothes. The Dieta Power Washers, owing to their different construction, are guaranteed to wash the clothes cleaner, in less time, with less pressure than any other power washer on the market.

1284 (Defendant's Exhibit 1, Letters Patent No. 1,506,783 to H. F. Snyder, September 2, 1924.)

950

Sept. 2, 1924. 1,506,783

H. F. SNYDER

WASHING MACHINE TUB

Filed Oct. 23, 1922

Fig. 1.

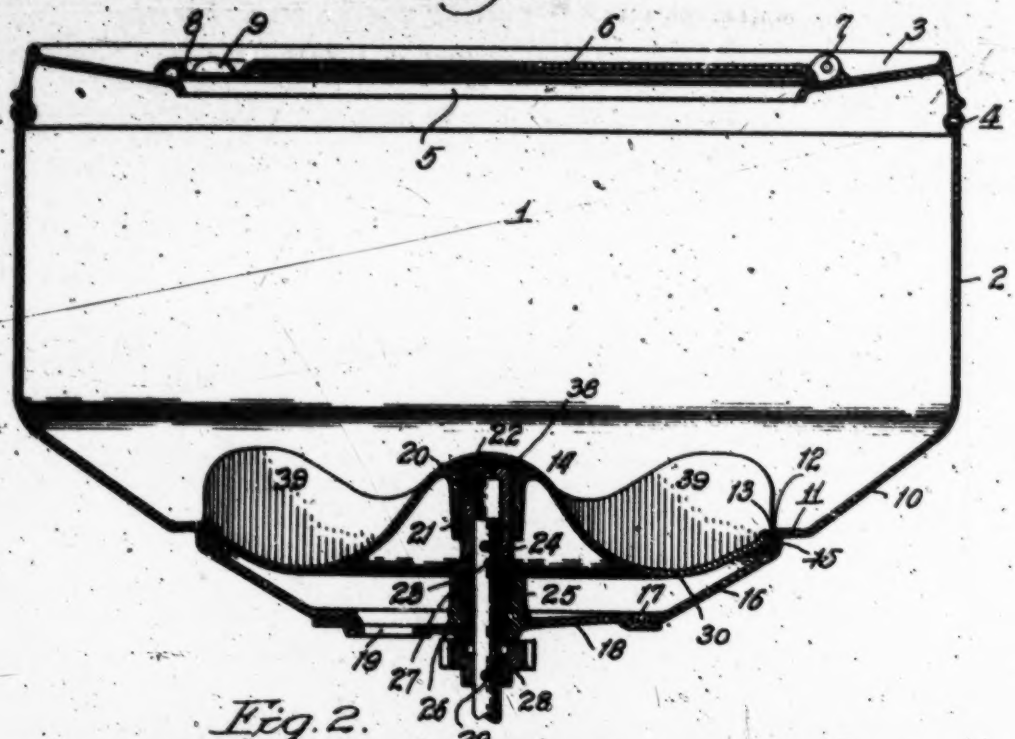
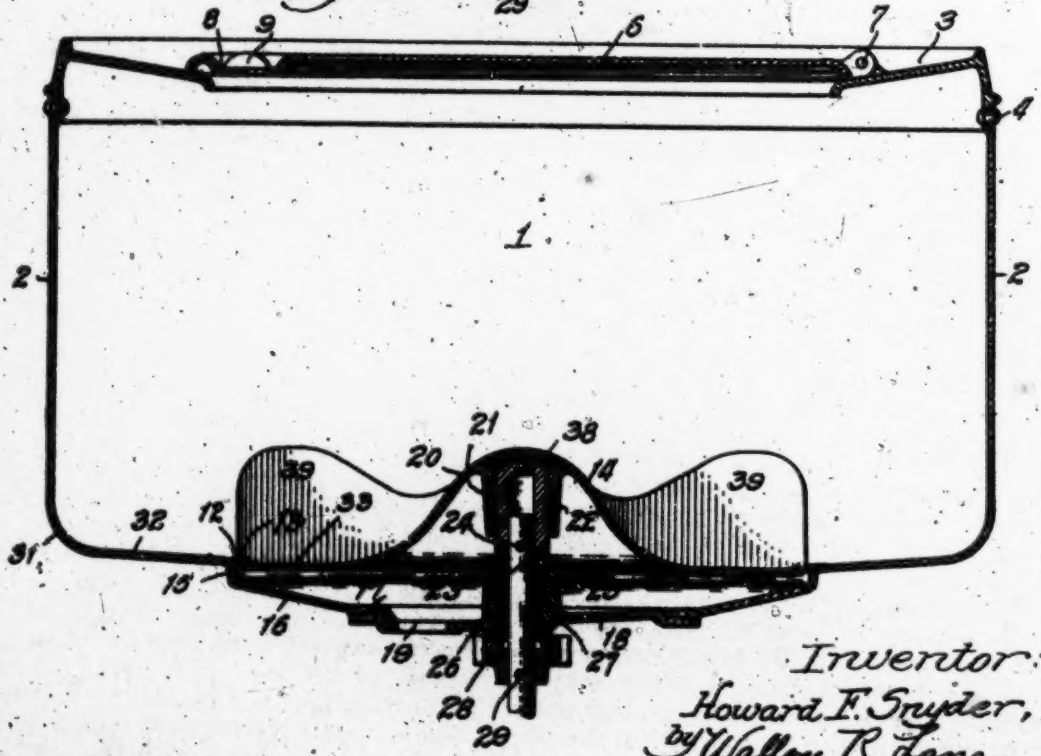


Fig. 2.



Inventor:
Howard F. Snyder,
by Wallace R. Lane
Atty.

Patented Sept. 2, 1924. 1,506,951

UNITED STATES PATENT OFFICE.

HOWARD F. SNYDER, OF NEWTON, IOWA, ASSIGNOR TO THE MAYTAG COMPANY, OF NEWTON, IOWA, A CORPORATION OF IOWA.

WASHING-MACHINE TUB.

Application filed October 23, 1922. Serial No. 596,378.

To all whom it may concern:

Be it known that I, HOWARD F. SNYDER, a citizen of the United States, residing at Newton, in the county of Jasper and State of Iowa, have invented certain new and useful Improvements in Washing-Machine Tubs, of which the following is a specification.

The present invention relates to washing machine tubs and has reference, more particularly, to the bottom portion of the tub and the surfaces of the gyratator, located near the lower portion of the tub, and the bottom of the tub.

Among the objects of the invention is to provide a construction so that the top surface of the gyratator and the top surface of the bottom of the tub will be even and form a substantially smooth continuous surface over which the materials to be washed may pass without catching upon the gyratator or the bottom of the tub and without causing any damage to the material; to so construct the device that the materials, such as clothing, lace curtains and delicate fabrics being washed, will be prevented from getting under the gyratator and clogging the operation of the same, or catching on any other part of the machine; and such further objects, advantages, and capabilities as will later more fully appear and are inherently possessed by the invention.

In the drawings illustrating two forms or embodiments of the invention;

Fig. 1 is a vertical sectional view of one form of washing machine tub constructed in accordance with the invention;

Fig. 2 is a similar view showing another form of the invention.

Referring more particularly to the drawings, the invention is shown as comprising a tub 1 which may be of any suitable shape, whether circular, square or other form and having vertical side walls 2, to the upper rim portion of which is attached a top member 3 by means of any suitable fastening members such as rivets 4. The top member 3 slants downwardly toward the middle of the top to an opening 5 which may be suitably closed by a cover or closing member 6, conveniently connected to the top member 3 by means of a hinge connection 7, as clearly shown in Figure 1 of the drawing. On the other side of the cover from that to which the hinge 7 is connected is formed a depression 8 in which is located a rigid or integral lug 9 adapted to be manually grasped for the purpose of opening and closing the cover 6, as desired.

At the lower portion of this tub, as shown in Fig. 1, is formed an inclined or oblique wall portion 10 extending downwardly to the bottom portion 11 which is preferably horizontal and has an inner margin 12 located closely adjacent to the outer margin 13 of a gyratator 14. From the inner margin 12 of the bottom 11 is a depending portion or flange 15 which connects with an inner inclined or oblique portion 16 leading to a flange 17 to which is connected, in any suitable manner, a drain plate 18, the drain plate 18 being formed with an inclined bottom extending to a drain opening 19, as clearly shown in Fig. 1 of the drawing.

The gyratator 14 is formed at its central portion with a conoidal central portion 20, having a depending socket member 21 fitting upon a sleeve 22 secured to a vertical shaft 23 by means of a cross pin 24. The shaft 23 extends downwardly through the drain plate 18, which is preferably provided with a packing box and bearing 25 extending upwardly from the drain plate 18 and around the shaft portion between the sleeve 22 and plate 18. Within the packing and bearing box 25 is suitable bearing material such as babbit 26 and packing materials 27 for preventing leakage of the washing liquid about the shaft as well as aiding in lubricating the shaft. To the lower portion of the shaft is secured a spur pinion 28 by means of a cross pin 29. This pinion is of utility to be connected with a suitable oscillating or alternately movable rack operated by the power mechanism of the washing machine. A suitable cap 38 may be provided to close the upper end of the gyratator or covering the upper end of sleeve 22.

The top wall of the gyratator extends downwardly from the central portion of the gyratator, then radially outwardly and then upwardly to its circular margin 13 which is located adjacent the margin 12 of the bottom 11 of the tub. The gyratator may also be provided with a plurality of radially extending vertical flanges 39 which are preferably formed integral with the remainder of the gyratator. Such gyratator is preferably formed of cast aluminum.

It will be noted that the outer margin

of the gyratator and the inner margin 12 of the bottom portion 11 of the tub, are located adjacent to each other and substantially upon the same level so that the lower curved portion 30 of the top of the gyratator will extend substantially in the same direction as the bottom of the tub and form therewith a substantially smooth continuous surface. In this way it will be observed that the materials being washed in the washing machine, and which are caused to pass radially from the center of the machine over the gyratator toward the side walls of the tub, will pass smoothly from the curved portion 20 over the margins 13 and 12 of the gyratator and tub respectively, and upwardly along or by the side wall portion 10 and the side wall 2 of the tub, without the materials being in any way damaged, or injured or becoming caught on any part of the tube or passing beneath the gyratator.

It will be noted that the lower inclined portion 16 of the tub, together with the drain plate 18, form a depression in the bottom of the tub in which the gyratator is operatively located so that the top surface of the gyratator will be even with the top surface of the bottom portion 11 of the tub.

In the tub as shown in Fig. 2 of the drawing, the construction is substantially the same as that described in Fig. 1, and all similar parts are designated by the same reference characters. Instead of having an inclined portion 10 and a narrow bottom portion 11, as shown in Fig. 1, the side wall 2 of the tub extends downwardly to a corner portion 31 extending inwardly to the horizontal or flat portion 32 of the tub, the portion 32 having the inner margin 12 located adjacent the outer margin 13 of the gyratator. It will also be noted that the depression of the bottom of the tub is more shallow than in the form shown in Fig. 1 of the drawing, and that the top surface of the gyratator has a more nearly flat portion 33 in lieu of the curved portion 30 of the form shown in Fig. 1 of the drawing. The portion 33 of the gyratator and the bottom 32 of the tub will form a substantially continuous flat surface, the inner margin of the gyratator and the outer margin of the tub being located adjacent to each other.

In the operation of the device the gyratator is preferably given an alternate rotary movement or oscillation, and the contents of the tub, including the washing materials, and the materials to be washed thereby, are acted upon in such a way that the materials will pass from the central portion of the tub over the gyratator toward the side walls of the tub and upwardly toward the upper portion of the tub, and then inwardly toward the middle portion of the tub and then downwardly toward the gyratator. During this movement it is highly important that none of the materials being washed, pass beneath the gyratator or become jammed or clogged in between the edge of the gyratator and the bottom portion of the tub, yet the washing material should have access to the draining portion of the tub in order that it, with the soil, may flow over the drain plate to the drain port 19. The drain port 19 may be closed by any suitable closing means, or connected in any suitable manner to a hose connection or the like so that the drain water may be drained off as desired.

While I have herein described and shown upon the drawings two embodiments of the invention, it is to be understood that the invention is not limited to the specific construction, details and arrangements of parts shown and described, but that other constructions, details, and arrangements of parts are comprehended by the invention without departing from the spirit thereof.

The construction herein set forth is an improvement on that described and claimed in my prior pending application Serial No. 568,158, filed June 14, 1922.

Having now described my invention, I claim:—

1. In a washing machine, a tub having a bottom, a gyratator operable near said bottom, the top surfaces of said gyratator and said bottom forming a smooth substantially continuous surface.

2. In a washing machine, a tub having a flat bottom, a gyratator operable near said bottom, the top surfaces of said gyratator and said flat bottom forming a smooth substantially continuous surface.

3. In a washing machine, a tub having a bottom provided with a depression in said bottom, a gyratator operable in said depression, the top surfaces of said gyratator and said bottom forming a smooth substantially continuous surface.

4. A washing machine, a tub having a bottom provided with a circular depression therein, a circular gyratator operable in said depression, the upper surfaces of the adjacent portions of said gyratator and said bottom forming a smooth substantially continuous surface.

5. In a washing machine, a tub having a bottom provided with a depression therein, a gyratator operable in said depressions, the outer margin of said gyratator and the inner margin of said bottom being located adjacent to each other whereby the materials being washed pass smoothly from the upper surface of the gyratator to the upper surface of the bottom.

6. In a washing machine, a tub having a bottom provided with a circular depression therein, a circular gyratator operable in said depression, the outer margin of said gyratator and the inner margin of said tub bottom being adjacent to each other whereby the passage of the contents of the tub from the

top surface of the gyratator to the bottom will be smooth.

7. A washing machine tub comprising an alternately rotary gyratator, and a bottom portion having a depression therein, the gyratator being located in said depression and having a top surface extending to and forming a substantially smooth continuation with the relatively stationary bottom portion of the tub, whereby the materials being washed may pass smoothly from said gyratator to the bottom of the tub.

8. A washing machine tub comprising a bottom having relatively movable portions, the upper surfaces of said portions lying in substantially the same plane.

9. A washing machine tub comprising a bottom having relatively movable portions, the top surfaces of said portions forming a substantially continuous surface whereby the contents of the tub may pass smoothly thereover.

10. In a washing machine tub provided with a recess in a wall thereof, a substantially disc shaped agitator seated in said recess and adapted to be turned therein, the operative surface of said agitator being formed to engage the materials to be washed and forming substantially a continuation of the aforesaid wall of the tub.

11. In a washing machine tub provided with a recess in the bottom wall thereof, a substantially circular shaped agitator seated in said recess and adapted to be turned therein, the operative surface of the agitator being formed to engage the materials to be washed and forming substantially a continuation of the aforesaid wall of the tub.

12. In a washing machine tub provided with a recess in the bottom wall thereof, a substantially disc shaped agitator seated in the recess and adapted to be turned therein, the operative surface of the agitator being formed to engage the materials to be washed and forming substantially a continuation of the aforesaid wall of the tub.

13. In a washing machine tub provided with a downwardly sloping recess in the bottom wall thereof and upwardly extending bars projecting upwardly from the bottom of the tub into said recess, a shaft extending through said bar, a substantially disc shaped agitator seated in said recess and adapted to be turned by said shaft, the operative surface of the agitator being formed to engage the materials to be washed and extending for a substantial distance substantially parallel to the bottom of the said recess.

14. In a washing machine tub provided with a recess having an outer vertical wall, a substantially circular agitator seated in said recess and having a beaded edge adapted to lie closely adjacent to the upper edge of the aforesaid vertical wall, the upper surface of the agitator being formed with upstanding wings whereby when the agitator is turned the materials to be washed are agitated.

In witness whereof, I hereunto subscribe my name to this specification.

HOWARD F. SNYDER.

DISCLAIMER.

1,506,783.—*Howard F. Snyder*, Newton, Iowa. WASHING-MACHINE TUB. Patent dated September 2, 1924. Disclaimer filed October 6, 1928, by the assignee by mesne assignments, *The Maytag Company*.

Hereby enters this disclaimer to those claims of the specification of said Letters Patent which are as follows:

"10. In a washing machine tub provided with a recess in a wall thereof, a substantially disc shaped agitator seated in said recess and adapted to be turned therein, the operative surface of said agitator being formed to engage the materials to be washed and forming substantially a continuation of the aforesaid wall of the tub.

"11. In a washing machine tub provided with a recess in the bottom wall thereof, a substantially circular shaped agitator seated in said recess and adapted to be turned therein, the operative surface of the agitator being formed to engage the materials to be washed and forming substantially a continuation of the aforesaid wall of the tub.

"12. In a washing machine tub provided with a recess in the bottom wall thereof, a substantially disc shaped agitator seated in the recess and adapted to be turned therein, the operative surface of the agitator being formed to engage the materials to be washed and forming substantially a continuation of the aforesaid wall of the tub.

"13. In a washing machine tub provided with a downwardly sloping recess in the bottom wall thereof and upwardly extending bars projecting upwardly from the bottom of the tub into said recess, a shaft extending through said bar, a substantially disc shaped agitator seated in said recess and adapted to be turned by said shaft, the operative surface of the agitator being formed to engage the materials to be washed and extending for a substantial distance substantially parallel to the bottom of the said recess."

[*Official Gazette October 23, 1928.*]

1289 (Defendant's Exhibit 2, Letters Patent No. 1,340,328 to A. B. Cooling, May 18, 1920.)

956

A. B. COOLING.

DRIVING MECHANISM FOR WASHING MACHINES.

APPLICATION FILED AUG. 14, 1911.

1,340,328. **Patented May 18, 1920.**

2 SHEETS—SHEET 1.

Fig. 1.

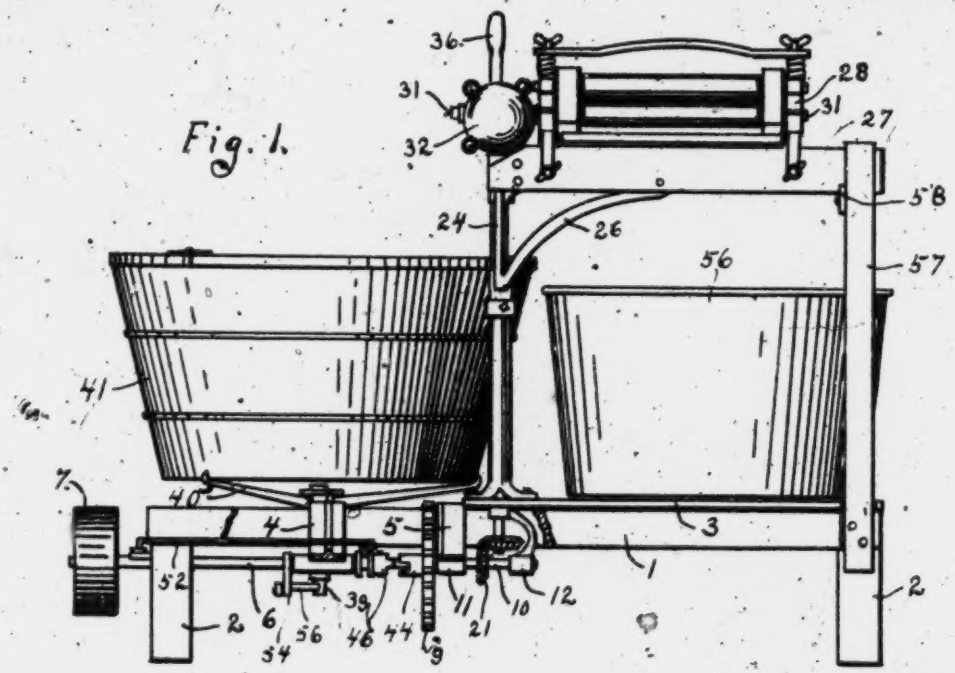
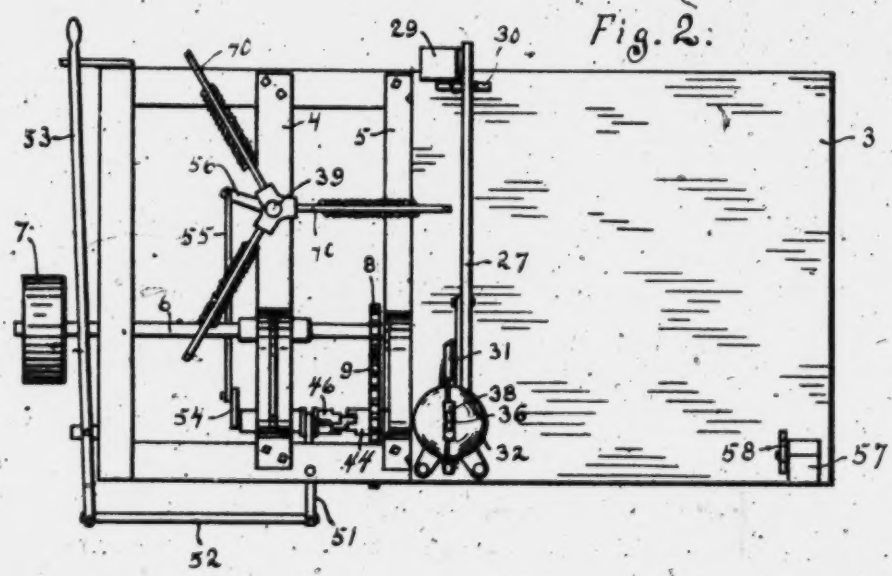


Fig. 2.



Inventor

Arthur B. Cooling.

By Walter N. Haskell,

his Attorney

Witnesses

H. J. Ward

W. P. Palmer

958

A. B. COOLING.

DRIVING MECHANISM FOR WASHING MACHINES.

APPLICATION FILED AUG. 14, 1911.

1,340,328.

Patented May 18, 1920.

2 SHEETS—SHEET 2.

Fig. 4.

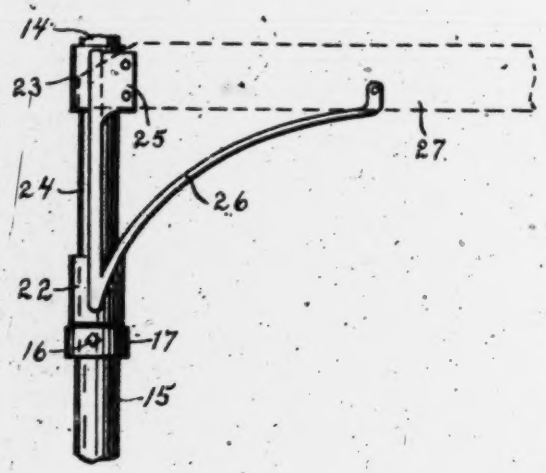
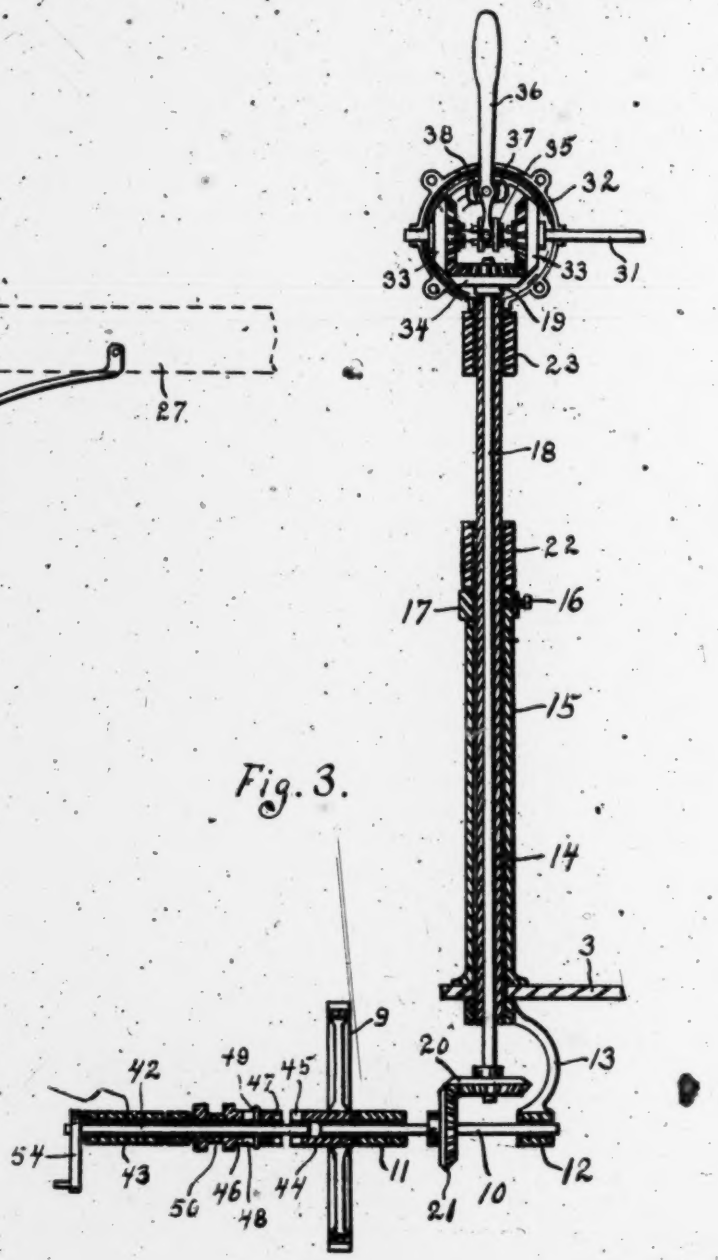


Fig. 3.



Witnesses

F. J. Ward

W. C. Palmer

Inventor

Arthur B. Cooling,

By Walter N. Haskell,

his Attorney

UNITED STATES PATENT OFFICE.

ARTHUR B. COOLING, OF STERLING, ILLINOIS, ASSIGNOR TO SUPERIOR MACHINE COMPANY, OF STERLING, ILLINOIS, A CORPORATION OF ILLINOIS.

DRIVING MECHANISM FOR WASHING-MACHINES.

1,340,328. Specification of Letters Patent. Patented May 18, 1920.

Application filed August 14, 1911. Serial No. 644,085.

To all whom it may concern:

Be it known that I, ARTHUR B. COOLING, a citizen of the United States, residing at Sterling, in the county of Whiteside and State of Illinois, have invented certain new and useful Improvements in Driving Mechanism for Washing-Machines, of which the following is a specification.

My invention pertains to mechanism for washing machines, and has reference more particularly to that class of such machines which are known as "platform" washers, and are fitted to be operated by mechanical power. In machines of that description it is usual to wash the clothes in a suitably operated tub and run them through a wringer into another tub containing rinse water, from which tub they are again run through the wringer into the clothes basket or other receptacle. This makes it necessary to change the position of the wringing apparatus, and in my device by the use of novel mechanism the wringer supporting and actuating means can be quickly shifted from one position to another without any adjustment of the mechanical parts, and without interrupting the movement of the wringer, if in operation. The wringer rolls can also be quickly stopped or reversed, if desired.

My invention also comprises mechanism whereby the operation of the washing machine and wringer devices can be controlled and actuated independently of each other.

In the drawings: Figure 1 is a side elevation of a machine embodying my invention, with a portion of the frame cut away. Fig. 2 is a plan view thereof, with the tubs and wringer removed and the wringer arm swung through an angle of 90°. Fig 3 shows the operating mechanism in detail, in vertical medial section. Fig. 4 is a detail showing the wringer-supporting devices.

Similar parts are indicated by corresponding reference numbers throughout the several figures.

1 represents the frame of the machine, supported on legs 2, and partially covered by a platform 3. At the open end of the frame are cross-pieces 4 and 5, beneath which is rotatably supported a shaft 6 upon the outer end of which is fixed a pulley 7, by means of which movement may be imparted to said shaft. Near the inner end of said shaft is fixed a gear pinion 8 meshing with a gear-wheel 9 fixed on a shaft 10, supported in a bearing 11 on the cross-piece 5 and a bearing 12 on a bracket 13. The bracket 13 is secured to the lower end of a vertical pipe 14 supported in a hollow standard 15 mounted on the platform 3, such pipe being held in place by means of a set-screw 16 in the head 17 of said standard.

Rotatably supported in the pipe 14 is a shaft 18 fixed to which near its upper end is a collar 19 resting upon the upper end of the pipe 14. Fixed to the lower end of the shaft 18 is a bevel-gear wheel 20, actuated by a similar wheel 21 secured on the shaft 10. Supported on the upper end of the standard 15, so as to have free movement of the pipe 14, is a sleeve 22, connected with a similar sleeve 23 by means of a bar 24. Projected from the upper end of such bar is a plate 25, and from the lower end of said bar extends a brace 26, to which plate and brace is secured a wringer support 27, on which is mounted the usual wringer 28. Such wringer-support and wringer are thus capable of a pivotal movement about the pipe 14, such support being normally held in position transversely of the frame of the machine by means of a post 29 fixed to such frame, and provided near its upper end with a gravity latch 30 by which accidental swinging of the wringer-support is prevented.

The shaft 31 of the lower wringer-roll is projected at one end beyond the wringer frame and supported in a spherical casing 32 supported on the sleeve 23. Mounted on the shaft 31, so as to rotate freely thereon, is a pair of bevel-gear wheels 33, actuated by a similar wheel 34 fixed on the upper end of the shaft 18, the movement of the wheels 33 being in opposite directions. The rotation of the shaft 6 is imparted through the shafts 10 and 18 to the wheels 33, causing a continuous rotation thereof. Centrally of the wheels 33 a clutch 35 is feathered on the shaft 31, the teeth of which are adapted to alternately engage corresponding clutch-teeth on the inner faces of said wheels. Engaging the clutch 35 is a lever 36, fulcrumed on a bearing 37 projecting inwardly from the casing 32, said lever passing upwardly through a slot 38 in the casing. When the lever 36 is in a vertical position the clutch 35 is not in engagement with either of the wheels 33, and the shaft 31 is stationary, but by a movement of such lever in one direction or the other the clutch

is brought into engagement with one or other of the wheels 33 and a forward or rearward movement of the wringer-rolls results.

Pivoted in the cross-piece 4 is a vertical hub 39, to which are fixed radial arms 40, upon which is supported a tub 41. A shaft 42 is supported at one end in a bearing 43 on the cross-piece 4, and at the other end in the hub 44 of the wheel 9, the outer end of such hub being provided with clutch-teeth 45. A sleeve 46 is slidably mounted on the shaft 42 and is provided with teeth 47, adapted to engage the teeth 45. The sleeve 46 is also provided with recesses 48 engaged by a pin 49 fixed in the shaft 42, limiting the movement of such sleeve longitudinally of the shaft, and compelling the rotation of the sleeve with such shaft. On the sleeve 46 is an annular recess 50, engaged by a lever 51 fulcrumed on the frame 1, the outer end of such lever being connected by a bar 52 with a hand-lever 53 fulcrumed at one end of the machine, and provided with a handle located conveniently to the operator.

At its outer end the shaft 42 is provided with a crank 54, connected by a bar 55 with an arm 56 fixed to the lower end of the hub 39, and upon the rotation of the shaft 42 an oscillating movement is imparted to said hub and the tub supported thereby.

The casing 32 is preferably formed of two hemispherical parts detachably united, for convenience in constructing the same and assembling the parts appurtenant thereto.

The operation of the machine may be substantially as follows: The tub 41 having been provided with a load of soiled garments and a quantity of water to effect the cleansing thereof, the tub is caused to oscillate by throwing the teeth 47 into engagement with the teeth 45, whereby the movement of the shaft 10 is communicated to the shaft 42, and through such shaft and the bar 55 to the hub 39. When the clothes have been sufficiently agitated they are passed from the tub 41 through the wringer 28 into a tub or other receptacle 56 on the platform 3. At this time the wringer is positioned transversely of the machine, and movement is imparted to the wringer rolls upon operation of the lever 36 to cause the rotation of the rolls in a direction to carry the garments away from the tub 41. If the tub 56 contains water for rinsing the clothes, and it is desired to repeat the wringing operation, this is accomplished by releasing the support 27 from engagement with the post 29 and swinging the same, with the wringer held thereon, into a position at right angles thereto, with the bar 27 in engagement with a post 57, fixed to the frame 1, against which post such bar is held by means of a latch 58. A basket or other receptacle can be placed near the platform 1, on the opposite side of the wringer from the tub 56, and the clothes again passed through the wringer from the tub into said basket. In some cases it is desired to run the garments through two rinse waters, in which case they could be passed from the tub 56 into another tub containing water, the tub 56 replaced by a basket, the movement of the wringer-rolls reversed, and the garments passed rearwardly through the wringer into such basket. While the wringer is in operation at the side of the platform the tub 41 can be provided with a new load of clothes, and the process of cleansing the same be carried on coincidently with the operation of wringing the preceding lot of garments.

It will be apparent that the change of position of the wringer 28 through the movement of the support 27 on its pivotal point will not disturb the relative position or operation of the shafts 31 and 18. By reason of the wheels 33 rotating freely upon the shaft 31 they readily adapt themselves to the new position.

While the mechanism is shown as applied to the operation of an oscillating frame, to impart a corresponding movement to the tub, it can be adapted for use with a machine wherein the tub is stationary and the rubbing of the clothes is accomplished by means of an oscillating dasher. Changes can also be made in the wringer actuating mechanism without departing from the spirit of the invention.

What I claim as my invention and desire to secure by Letters Patent of the United States, is:

1. In a driving mechanism, the combination with a tubular support, a hollow shaft mounted therein, and a drive shaft journaled in said hollow shaft, of a part to be operated supported on said hollow shaft and including a driven shaft, a bearing member carried by said hollow shaft and supporting said driven shaft, and a driving connection disposed within the bearing member, between the drive and driven shafts including means for reversing the rotation of said driven shaft.

2. In a device of the character described, in combination, a frame, a driving shaft, means for operating said shaft, a support swingable on said shaft, a driven shaft on said support, reversible actuating gears loosely mounted on said driven shaft, means for alternately clutching said gears to said driven shaft, and a mechanism on said swingable support adapted to be operated by said gears.

3. In a device of the class described, a suitable support, an operating means mounted on said support and adapted to be swung to different positions relative to said support, means to lock the operating means in different positions on said support, a drive shaft, connections including a clutch between

the shaft and said operating means, and a controlling element controlling said clutch, said controlling element swingable with said operating means.

4. In a device of the class described, a suitable support, an operating means mounted on said support and adapted to be swung to different positions relative to said support, said operating means including a shaft extension and a bevel gear thereon, means to lock the operating means in different positions on said support, a drive shaft geared to the bevel gear on the shaft of the operating means, a clutch arranged to control the direction of rotation of said operating means, and a controlling element controlling said clutch, said controlling element swingable with said operating means.

5. In a device of the class described, a suitable support, a driving shaft disposed horizontally on the support, an upright shaft adapted to be driven from said driving shaft, a frame member extending radially from the upper end of said upright shaft and swingable in an arc of a circle about said shaft, mechanism on said frame member adapted to receive power from said upright shaft, clutch driving connections for controlling the operation of said mechanism, and means for controlling said clutch.

6. In a device of the class described, a suitable support, a driving shaft disposed horizontally on the support, an upright shaft adapted to be driven from said driving shaft, a frame member extending radially from the upper end of said upright shaft, said shaft being the pivotal point about which said frame member is swingable, means for locking the frame member in positions at right angles to each other, as desired, mechanism on said frame member including a shaft, gearing between said last mentioned shaft and said upright shaft, a clutch controlling the transmission of power between said gearing, and an operator's rod controlling said clutch.

7. In a device of the class described, a suitable support, a horizontally disposed driving shaft, a vertically disposed countershaft, bearings from said support for said vertical shaft, means for operating a counter-shaft from the driving shaft, a horizontally disposed wringer frame member, a bearing for said frame member about said counter-shaft, to adapt said frame member to be swung in an arc of a circle about said counter-shaft, means for locking the frame member in one or more adjusted positions, mechanism on the wringer frame member including a pair of roller shafts mounted for rotation therein, and gearing for operating said roller shafts from said counter-shaft.

8. In an apparatus of the character described, a main frame, a driving shaft journaled on said frame and adapted to be driven from a suitable source of power, a mechanism support arranged in an elevated position above said main frame, a vertically disposed shaft adapted to be driven from said driving shaft, means for supporting the mechanism support so as to swing the mechanism support about said vertical shaft, a mechanism mounted on said mechanism support, driving connections between said mechanism and said vertical shaft, and clutch device for reversing the operation of said mechanism.

9. In an apparatus of the character described, a main frame, a driving shaft journaled on said main frame and adapted to be driven from a suitable source of power, a mechanism support arranged in an elevated position above said main frame, a vertically disposed shaft adapted to be driven from said driving shaft, means for supporting the mechanism support so as to swing the mechanism support about said vertical shaft, a mechanism mounted on said mechanism support, driving connections between said mechanism and said vertical shaft, clutch devices for reversing the operation of said mechanism, and means for locking the mechanism support in adjusted positions on said main frame.

10. In an apparatus of the character described, a main frame, a driving shaft journaled on said frame and adapted to be driven from a suitable source of power, a horizontally disposed mechanism support arranged in an elevated position above said main frame, a vertically disposed shaft adapted to be driven from said driving shaft, supporting connections between said mechanism support and said vertical shaft to adapt said mechanism support to swing about said vertical shaft, a mechanism mounted on said mechanism support, clutch controlled gearing at the upper end of the vertical shaft and connected to drive said mechanism on the mechanism support, and an operator's rod connected with said clutch mechanism for reversing the direction of movement of said mechanism.

11. In an apparatus of the character described, a main frame, a horizontally disposed driving shaft journaled on said frame and adapted to be driven from a suitable source of power, a vertically disposed countershaft, gearing between said driving shaft and said counter shaft, a mechanism support connected at one end to swing about the upper end of said counter shaft, a mechanism carried on said mechanism support, gearing at the upper end of the counter shaft for driving said mechanism from said counter shaft, a clutch mechanism in said gearing for reversing the operation of the mechanism, and an operator's rod for actuating said clutch mechanism.

12. The combination of a pivotally sup-

pivoted member adapted to swing, a mechanism supported thereon, a driving gearing adapted for operating the mechanism including a part for imparting opposite directions of rotation to the mechanism elements, part of said gearing being mounted on said member to swing therewith, and manually operated means in control of said gearing.

13. In a machine of the character described, a main frame, a supplemental frame pivotally mounted thereon and adapted to be swung to different angular positions relative to said main frame, an operating means mounted on said supplemental frame, a power driven element, and connections between said power driven element and said operating means to actuate said operating means, as desired, in its different positions relative to said main frame, said connections including reversing means for actuating the operating means in either direction, as desired.

14. In a machine of the character described, a main frame, a supplemental frame pivotally mounted thereon and adapted to be swung to different angular positions relative to said main frame, an operating means mounted on said supplemental frame, actuating means for said operating means, including a power driven element, said power driven element being adapted to be thrown into and out of operative relation with parts of said actuating means for driving said operating means in either direction, as desired.

15. In a mechanism of the class described, the combination of a suitable support, a pair of horizontal roller shafts geared together and mounted one above the other on said support, said roller shafts being relatively adjustable to change the distance from one to the other and being adapted to swing in a horizontal plane, a pinion for one of said shafts, a vertical shaft carried by said support in vertical alinement with the pivotal axis of said horizontally swinging shafts, a pinion arranged on said vertical shaft to mesh permanently with said first mentioned pinion which rolls around said second pinion when the horizontal shaft is swung about its vertical pivot, a motor driven shaft mounted on said support, and a driving connection between said motor driven shaft and said vertical shaft.

16. In a mechanism of the class described, the combination of a suitable support, a frame carried by said support and adapted to swing bodily in a horizontal plane, bearings in said frame, a pair of parallel roller shafts geared together and mounted in the bearings of said frame, said shafts being horizontally disposed, and power driven connections to one of said roller shafts, said driving connections being operative irrespective of the position of said frame in its horizontal plane.

17. In a mechanism of the character described, the combination of a support, a power source in fixed position relatively thereto, a pair of horizontal roller shafts, gears connecting said shafts together, resilient means for holding said roller shafts relative to one another, a frame supporting said roller shafts, said frame being movable outward from said support to a new position, and gear driving connections from said power source to said roller shafts, said connections being operative to drive said roller shafts either forward or backward when said frame is in either of its positions.

18. In a mechanism of the character described, the combination of a support, a pair of horizontal roller shafts geared together, resilient means for holding said roller shafts relative to one another, a frame supporting said roller shafts, said frame being mounted to swing to a new position, and driving connections for said shafts, said connections being operative to drive said roller shafts, when said frame is in its different positions, said driving connections including mechanically reversing means whereby said roller shafts may be instantly started, reversed or allowed to stop at the will of the operator.

19. In a machine of the class described, a frame, a vertical shaft thereon, means to drive said vertical shaft, a support adapted to swing about said vertical shaft, in a horizontal plane, a pair of parallel roller shafts geared together and arranged horizontally in said support, driving connections whereby said roller shafts may be driven in any position of their support relative to said vertical shaft, reversing means for reversing the direction of rotation of said roller shafts.

20. In a machine of the class described, a frame, a vertical shaft thereon, means to drive said vertical shaft, a support adapted to swing about said vertical shaft in a horizontal plane, a pair of parallel roller shafts geared together and arranged horizontally in said support, driving connections whereby said roller shafts may be driven in any position of their support relative to said vertical shaft, reversing means for reversing the direction of rotation of said roller shafts, and means for locking said support in adjustable position about said shaft.

21. In a machine of the class described, a support, a vertical shaft thereon, means to drive said vertical shaft, a frame adapted to swing about said vertical shaft in a horizontal plane, a pair of adjacent roller shafts arranged one above the other supported in

said frame, driving means whereby said roller shafts may be driven in any position of the support relative to the vertical shaft.

22. In a machine of the class described, a support, a vertical shaft thereon, a frame adapted to swing about said vertical shaft on an axis, a pair of parallel adjacent roller shafts geared together for rotation in opposite directions and arranged horizontally in said frame, provided with means whereby said roller shafts may be driven in any position of the support relative to said vertical shaft and means to lock said frame in adjusted position about said vertical shaft.

23. In a mechanism of the class described, the combination of a suitable support, a pair of horizontal roller shafts geared together and mounted on said support said shafts being adapted to swing in a horizontal plane, a pinion for one of said shafts, a vertical shaft carried by said support in vertical alinement with the pivotal axis of said horizontally swinging shafts, a pinion arranged on said vertical shaft to mesh permanently with said first mentioned pinion which rolls around said second pinion when the horizontal shaft is swung about its vertical pivot, a motor driven shaft mounted on said support, and a driving connection between said motor driven shaft and said vertical shaft.

24. In a mechanism of the class described, the combination of a support, a vertical shaft carried by said support, a pinion on said vertical shaft, a bracket mounted to swing about said vertical shaft as an axis, a frame supported by said bracket and having bearings, two parallel contiguous roller shafts carried by said frame and geared together for rotation in opposite directions, a gear connection between said vertical shaft and one of said roller shafts which connection remains operative when said frame is swung about its vertical axis, and means for securing said bracket after it has been swung to a new position.

25. In a mechanism of the class described, the combination of a suitable support, a pair of horizontal roller shafts geared together for rotation in opposite directions and adapted to swing in a horizontal plane, a vertical shaft carried by said support in vertical alinement with the pivotal axis of said horizontally swinging shafts, a gear connection permitting said horizontal shafts to swing about their vertical pivot while driving connection is maintained to said roller shafts, a driving shaft mounted on said support, and a driving connection between said driving shaft and said vertical shaft.

26. In a mechanism of the class described, the combination of a pair of horizontal roller shafts, resilient means for holding said roller shafts in operative position relative to one another, a frame supporting said roller shafts and movable outward from one location to a second location, driving gears for said roller shafts, a power shaft and driving connections for propelling said gears from said power shaft, said gears and connections being operative to drive said roller shafts when said frame is in either of the two locations.

27. In a machine of the class described, a support, a vertical shaft thereon, means to drive said vertical shaft, a frame adapted to swing about said vertical shaft in a horizontal plane, a pair of parallel adjacent roller shafts geared together and arranged horizontally one above the other in said frame, driving means whereby said roller shafts may be driven in any position of the support relative to said vertical shaft.

28. In a machine of the class described, a support, a vertical shaft thereon, means to drive said vertical shaft, a frame adapted to swing about said vertical shaft in a horizontal plane, a pair of parallel adjacent roller shafts geared together for rotation in opposite directions and arranged horizontally in said frame, driving means whereby said roller shafts may be driven in a plurality of positions of the support relative to said vertical shaft, and means to lock said frame in adjusted position about said vertical shaft.

29. In a device of the character described, a support, a drive shaft carried by said support, a frame pivoted above said support, a plurality of elements mounted on said support at equal distances from the pivot of said frame, means for locking said frame in engagement with said elements, respectively, a shaft in said frame, and means for driving said shaft in either direction by the constant rotation of said drive shaft in one direction, substantially as described.

30. In a device of the character described, a support, a drive shaft carried by said support, a frame movably supported above said support, a shaft in said frame, a transmission shaft driven by said drive shaft, gearing whereby said transmission shaft will drive said shaft in said frame in any position of said frame, a plurality of elements mounted on said support at equal distances from said transmission shaft, a member on said frame arranged to engage with said elements, respectively, to hold said frame in its various adjustments, and means for releasing said member from said elements.

31. In a machine of the class described, a supporting frame, a horizontal driving shaft, a vertical shaft, means for operating the vertical shaft from the horizontal shaft, a horizontally disposed wringer operating mechanism comprising a pair of roller

shafts, a bearing about the vertical shaft for said operating mechanism to adapt said mechanism to be moved in the arc of a circle around said vertical shaft, means for locking the operating mechanism in different adjusted positions, and gearing connecting with said mechanism for transmitting motion thereto from the vertical shaft.

32. The combination of a pivotally supported mechanism adapted to be moved in the arc of a circle, driving gearing adapted for operating the mechanism including a part for imparting opposite directions of rotation to the mechanism elements, part of said gearing being mounted on said member to move therewith, and manually operated means for controlling said gearing.

33. In a machine of the class described, a main frame, a vertical shaft, an operating mechanism pivotally mounted on said shaft and adapted to be moved to different angular positions relative thereto, actuating means including a power driven element, said power driven element adapted to be thrown into and out of operative relation with parts of said actuating means for driving said operating mechanism in either direction.

34. In apparatus of the class described, a driving shaft, a mechanism support swingingly mounted about the axis of said driving shaft, a pair of wringer rolls on said support, an extension shaft on one of said rolls, a pair of spaced gears loosely mounted on said extension shaft, a gear fixed on said driving shaft and engaging said spaced gears, said spaced gears being rollable about the gear on the driving shaft to continuously engage the same as the mechanism support is swung horizontally, a clutch member slidably mounted on said extension shaft between said spaced gears and adapted to selectively engage either of said spaced gears whereby said rolls may be rotated in either direction as desired, and a handle for operating said clutch member to move the same into engagement with one or the other of said spaced gears for the purposes set forth.

35. In apparatus of the class described, a driving shaft, a mechanism support swingingly mounted about the axis of said driving shaft, a pair of wringer rolls on said support, an extension shaft on one of said rolls, a pair of spaced gears loosely mounted on said extension shaft, a gear fixed on said driving shaft and engaging said spaced gears, said spaced gears being rollable about the gear on the driving shaft to continuously engage the same as the mechanism support is swung horizontally, a clutch member slidably mounted on said extension shaft between said spaced gears and adapted to selectively engage either of said spaced gears whereby said rolls may be rotated in either direction as desired, a handle for operating said clutch member to move the same into engagement with one or the other of said spaced gears for the purposes set forth, and means for locking said swinging mechanism support in any one of a plurality of horizontal positions.

In testimony whereof I affix my signature in presence of two witnesses.

ARTHUR B. COOLING.

Witnesses:
W. N. HASKELL,
F. G. GIFFROW.

Certificate of Correction In Letters Patent No. 1,340,328.

It is hereby certified that in Letters Patent No. 1,340,328, granted May 18, 1920, upon the application of Arthur B. Cooling, of Sterling, Illinois, for an improvement in "Driving Mechanism for Washing-Machines," an error appears in the printed specification requiring correction as follows: Page 3, line 51, claim 7, for the article "a" read *the;* and that the said Letters Patent should be read with this correction therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 28th day of September, A. D., 1920.

[SEAL.]

M. H. COULSTON,
Acting Commissioner of Patents.

1299 (Defendant's Exhibit 3, Letters Patent No. 1,693,003 to H. F. Snyder, November 27, 1928.)

966 Nov. 27, 1928. H. F. SNYDER 1,693,003

PACKING AND PACKING DEVICE

Filed June 14, 1922

Fig. 1.

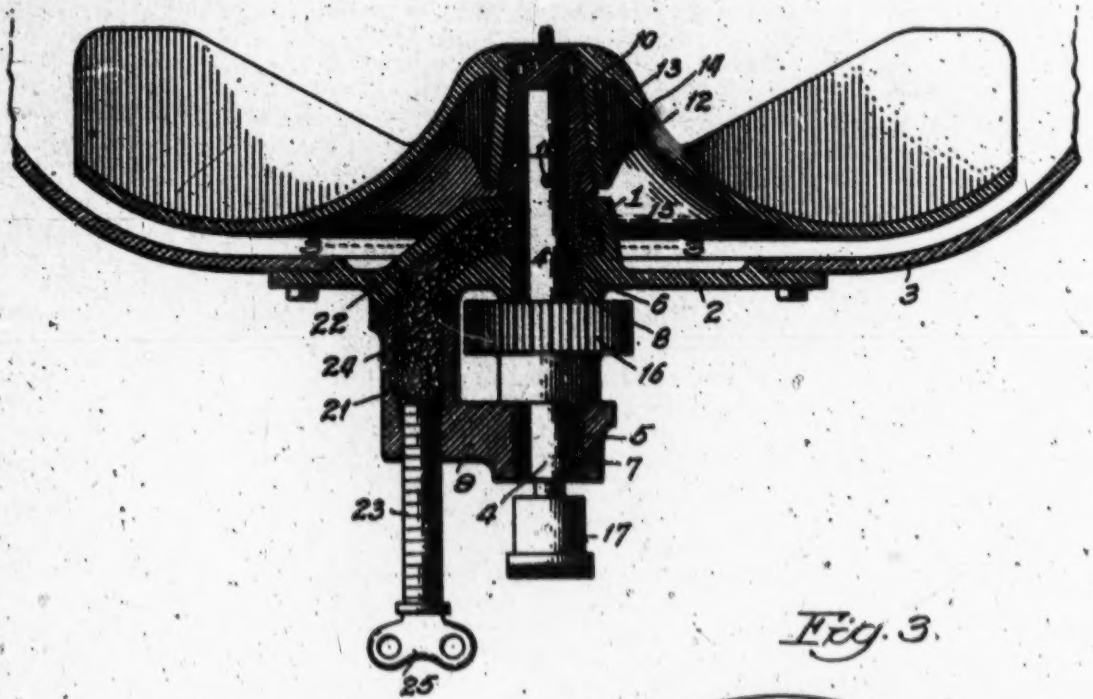


Fig. 3.

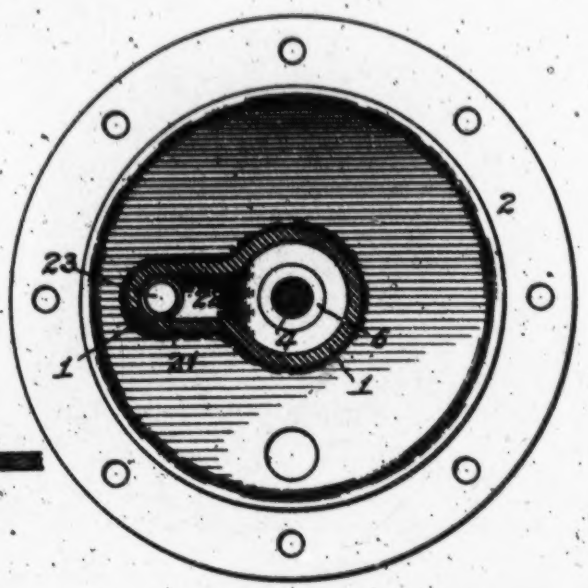
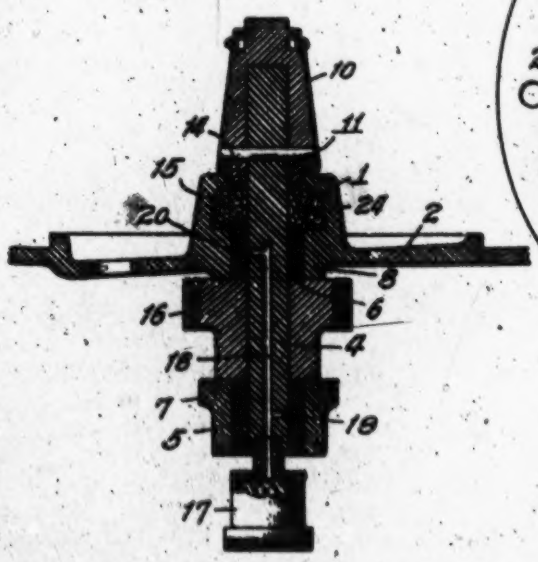


Fig. 2.



Inventor:
Howard F. Snyder,
by Wallace R. Lane
Atty.

Patented Nov. 27, 1928.

UNITED STATES PATENT OFFICE. 967

HOWARD F. SNYDER, OF NEWTON, IOWA, ASSIGNOR, BY MESNE ASSIGNMENTS, TO THE MAYTAG COMPANY, OF NEWTON, IOWA, A CORPORATION OF DELAWARE.

PACKING AND PACKING DEVICE.

Application filed June 14, 1922. Serial No. 568,157.

The invention relates to packings and packing devices, and more particularly to the type of packings and packing devices adapted for use with oscillating and rotating shafts.

Among the objects of the invention are to provide a new type of packing and packing device adapted for use in washing machines, particularly that having an agitator operated by a shaft extending through the bottom of the tub; to provide a construction wherein the packing surrounds the shaft and is located between the bearings for the shaft; to provide means, preferably in the form of a screw plunger, for applying pressure, from time to time, as may become necessary, to compensate for the loss in packing owing to wear and leakage of the packing through the bearing or bearings; to provide a packing of comminuted asbestos and graphite, with or without oil, so that the packing mass will be in a sort of fluidal state, whereby, when pressure is applied to the mass, as by a screw plunger, the mass will flow about the shaft and into the bearing or bearings and not only lubricate the same but also form a water seal about the shaft and for the bottom of the tub; and such further objects, advantages and capabilities as will hereinafter more fully appear.

My invention further resides in the composition of matter, combination, construction, and arrangement of parts described herein and illustrated in the accompanying drawings, and while I have shown therein a preferred embodiment, I desire the same to be understood as only illustrative of and not as limiting my invention.

In the accompanying drawing illustrating my invention:—

Fig. 1 is a vertical sectional view through the packing device and a portion of a washing machine.

Fig. 2 is a detail sectional view through the agitator supporting and operating means.

Fig. 3 is a sectional view taken on line 3—3 of Fig. 1.

Referring more in detail to the drawing, the packing device illustrated comprises a chamber 1 forming an integral portion of a plate 2 bolted to, and closing the lower opening of, a tub 3 of a washing machine. An agitator shaft 4 extends vertically through the chamber 1 and is rotatably supported in bushings 5 and 6 respectively located in bearing hubs 7 and 8 forming integral portions of the plate 2 and a bracket 9 secured, in a suitable manner, to the underside of the plate 2. To the upper end of the shaft 4 is fastened a step 10 by means of the cross-pin 11 extending transversely through the shaft 4. The step 10 is of pyramidal form and square in cross section. It extends upwardly above the bottom of the tub 3 and supports an agitator 12 which has a depending hollow socket 13, also square in cross section, to fit upon the step. The step has a lower end portion 14 of cylindrical form which rotatably fits into a circular opening provided in the upper wall of the chamber 1. Against the lower end of the step and surrounding the shaft, as well as fitting in the opening in the upper wall of the chamber 1, is a leather packing washer 15.

Upon the shaft 4 between the hubs 7 and 8, is keyed a pinion 16 which is in thrust engagement with the hubs 7 and 8. This pinion is designed to be operated by a reciprocating rack driven by the operating mechanism of the washing machine, in order to give the agitator, through the media of the pinion 16, the shaft 4 and step 10, an angular reciprocation or oscillation within the tub 3. The lower end of the shaft has a grease cup 17 for supplying a suitable lubricant, to the bearings, in bushings 5 and 6, through the bores 18, 19 and 20 provided in the shaft 4.

The bracket 9 is provided, at one side, with a plunger chamber 21 communicating with the chamber 1 by means of a passage 22 formed integral with the chamber 1. In the lower portion of the bracket 9 is provided a threaded aperture designed to receive a screw plunger 23 into the plunger chamber 21. Within the plunger chamber 21, the passage 22, and the chamber 1, is located a packing or packing material 24 composed preferably of asbestos, graphite and oil. The asbestos is cut into fine pieces or shredded so as to provide a comminuted mass. The lower end of the plunger 23 has a finger piece 25 by which the plunger may be manually rotated to apply pressure to the packing material and cause the same to be forced along the passage 22 and into the chamber 1 around the shaft 4, and against the packing washer 15 and the upper wall of the chamber. The packing material is semi-plastic and in a sort of a fluidal state such

that when the plunger is operated to stress the mass in the plunger chamber it will cause the packing to flow through the passage 22 and into the chamber 1. In this way any loss of material owing to wear or leakage through the bearings will be compensated for by a simple turn of the plunger screw. In this way leaking of the cleansing or other fluids contained in the tub 3, downwardly through the opening in the upper wall of the chamber, will be prevented.

In addition to the packing material acting as a packing it also acts as a lubricant owing to its oil and graphite constituents. At the same time the bearings in bushings 5 and 6 will be maintained lubricated by the lubricating ingredients contained in the packing material.

It is of course understood that the specific description of structure and composition of matter set forth above may be departed from without departing from the spirit of my invention as set forth in this specification and the appended claims.

Having now described my invention, I claim:

1. A shaft packing and lubricating device for washing machines comprising bearings for said shaft, a packing chamber surrounding said shaft, said chamber having side walls connected to the bottom portion of a washing machine and making a tight closure to prevent any leakage from said machine, a plunger chamber eccentrically located with respect to said shaft, a passage extending from said plunger chamber and extending to said packing chamber, a fluidal packing in said chambers and passage, and a vertically disposed screw plunger located in said eccentrically disposed plunger chamber and operable to compensate for loss and to lubricate said bearings.

2. A shaft packing and lubricating device for washing machines comprising bearings for said shaft, a packing chamber surrounding said shaft, said chamber having side walls connected to the bottom portion of a washing machine and making a tight closure to prevent any leakage from said machine, a plunger chamber eccentrically located with respect to said shaft, a passage extending from said plunger chamber and extending to said passage chamber, a fluidal packing in said chambers and passage, and means in said eccentrically disposed plunger chamber operable to compensate for loss and to lubricate said bearings.

3. A shaft packing and lubricating device for washing machines, comprising a combined plate and bracket secured to the bottom of a washing machine and preventing leakage therefrom, bearings secured in said bracket member, a packing chamber surrounding said shaft, a plunger chamber eccentrically located with respect to said shaft, a passage extending from said plunger chamber and extending to said packing chamber, a fluidal packing in said chambers and passage, and a vertically disposed screw plunger located in said eccentrically disposed plunger chamber and operable to compensate for loss and lubricate said bearings.

4. A shaft packing and lubricating device for washing machines, comprising a combined plate and bracket secured to the bottom of a washing machine and preventing leakage therefrom, bearings secured in said bracket member, a packing chamber surrounding said shaft, a plunger chamber eccentrically located with respect to said shaft, a passage extending from said plunger chamber and extending to said packing chamber, a fluidal packing in said chambers and passage, and means in said eccentrically disposed plunger chamber and operable to compensate for loss and to lubricate said bearing.

5. A shaft packing and lubricating device for washing machines, comprising a combined plate and bracket secured to the bottom of a washing machine and preventing leakage therefrom, bearings secured in said bracket member, a packing chamber located above said bearings and surrounding said shaft, a plunger chamber eccentrically located with respect to said shaft, a passage extending from said plunger chamber and extending to said packing chamber, a fluidal packing in said chambers and passage, and means in said plunger chamber operable to compensate for loss and to lubricate said bearings.

In witness whereof I hereunto subscribe my name to this specification.

HOWARD F. SNYDER.

1303 (Defendant's Exhibit 4, Letters Patent No. 1,572,002 to A. J. Dremel, February 9, 1926.)

970

Feb. 9, 1926.

1,572,002

A. J. DREMEL

WRINGER MECHANISM

Original Filed Feb. 11, 1918 3 Sheets-Sheet 1

Fig. 1.

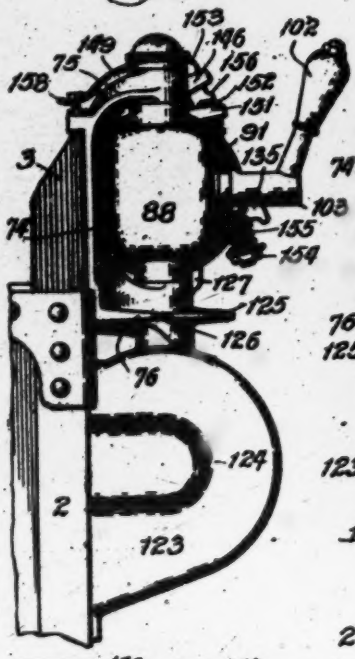


Fig. 2.

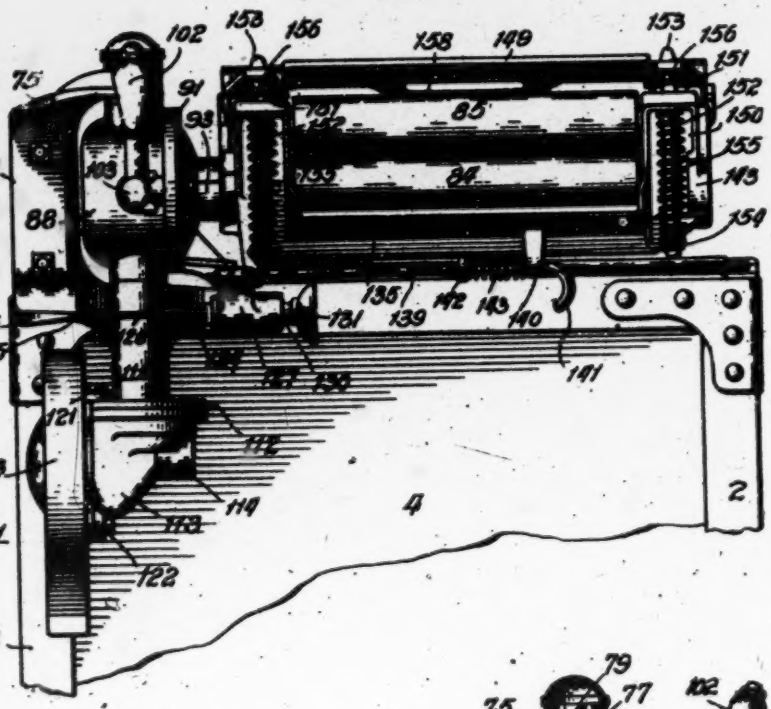


Fig. 3.

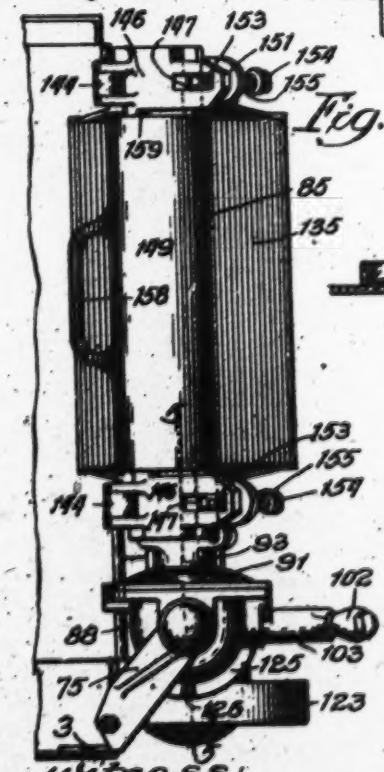
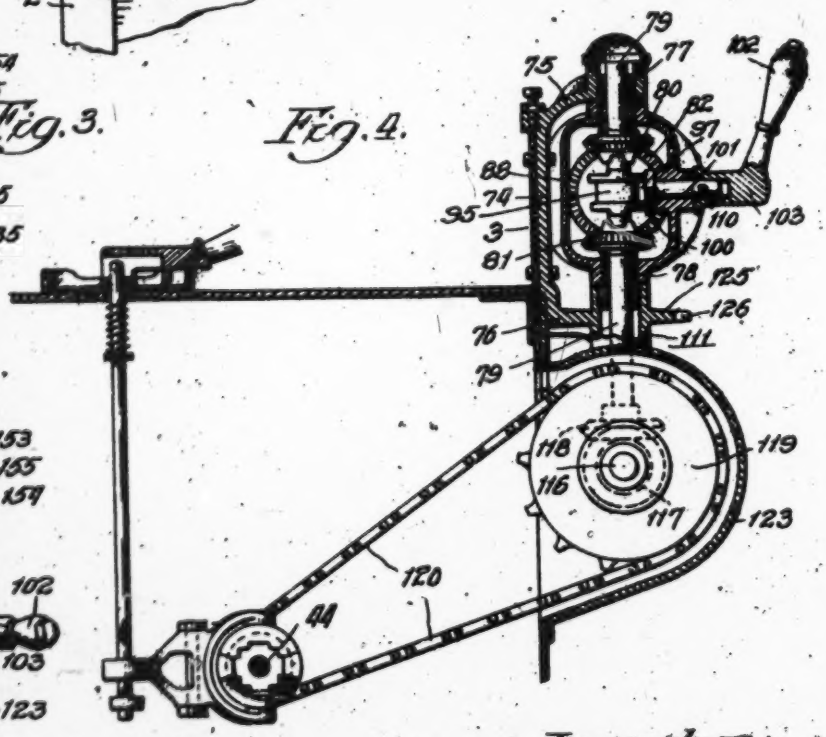


Fig. 4.



Witnesses:
John Enders
Merrill M. Blackburn

Inventor:
Albert J. Dremel,
by Wallace R. Lane
Atty's

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PAGE

Feb. 9, 1926. 1,572,002

A. J. DREMEL

WRINGER MECHANISM

Original Filed Feb. 11, 1918 3 Sheets-Sheet 2

Fig. 5.

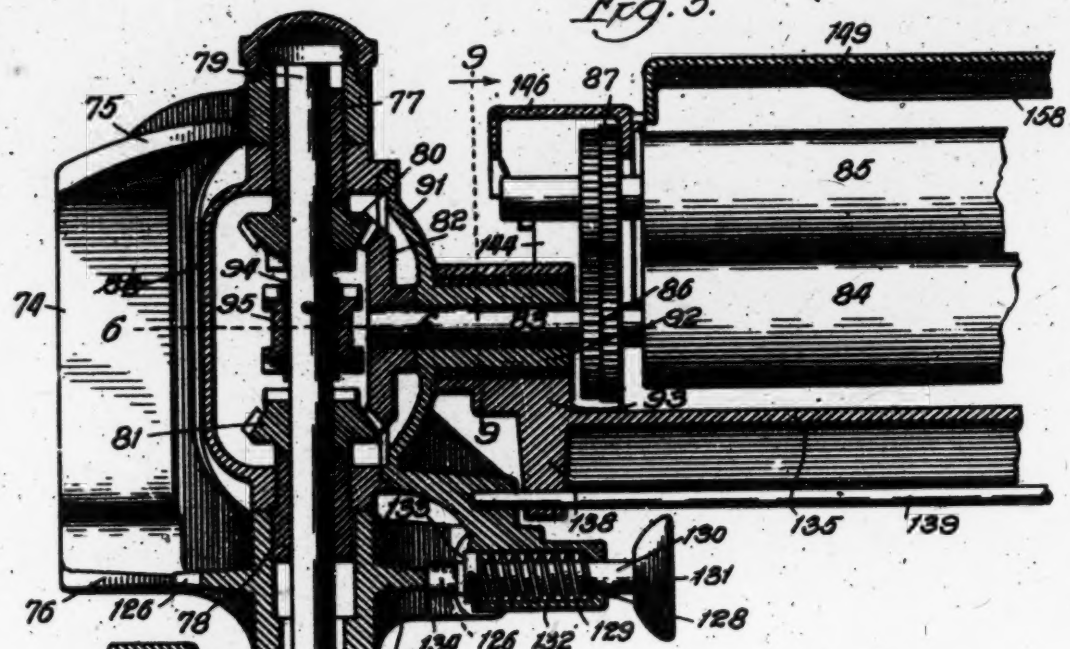


Fig. 6.

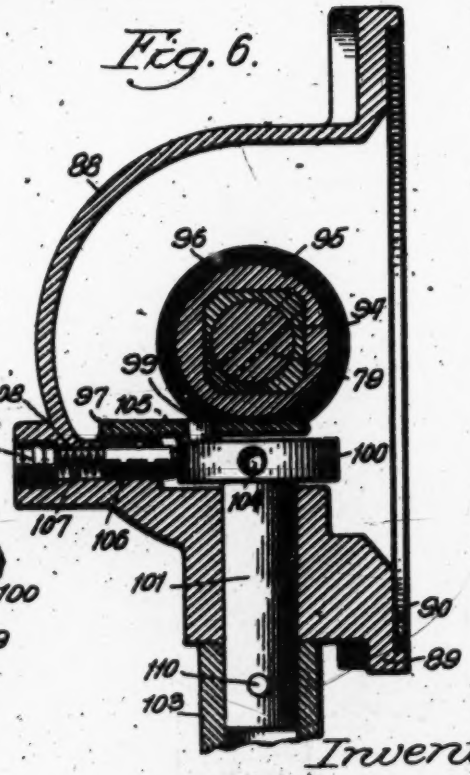
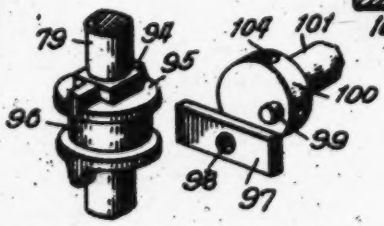


Fig. 7.



Witness:
John Enders
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Atty.

974 Feb. 9, 1926. 1,572,002

A. J. DREMEL

WRINGER MECHANISM

Original Filed Feb. 11, 1918 3 Sheets-Sheet 3

Fig. 8.

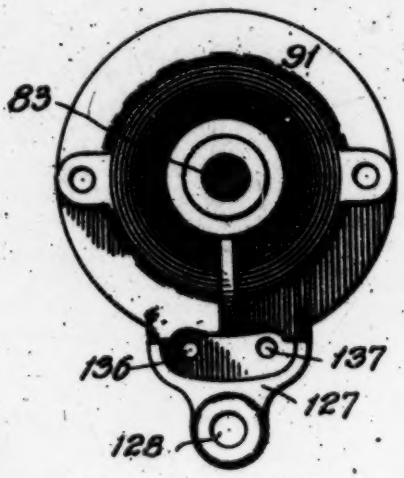


Fig. 9.

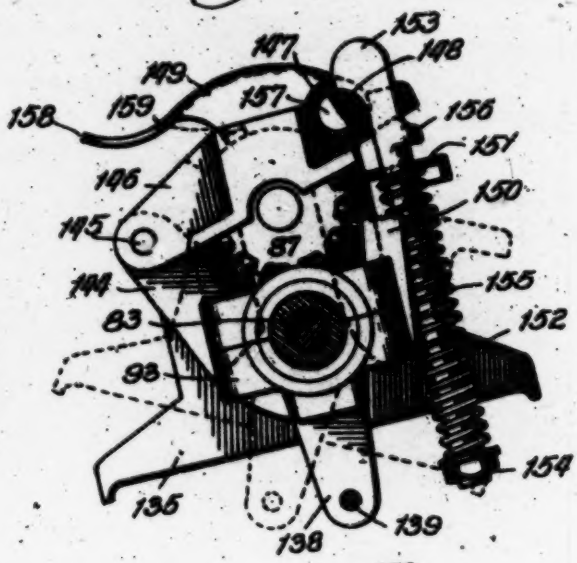


Fig. 10.

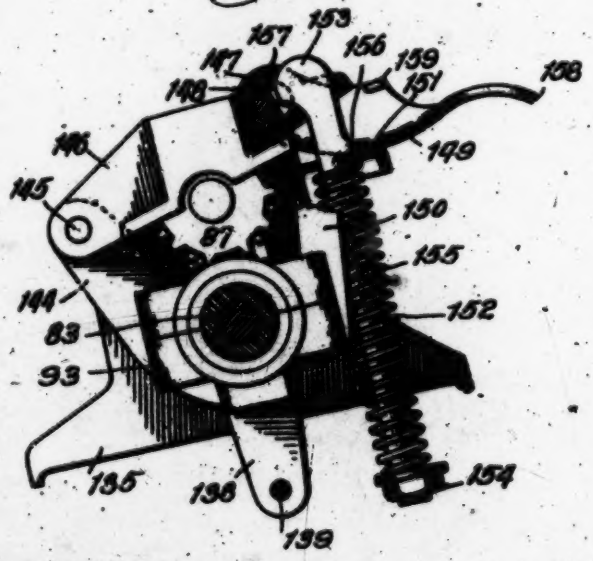
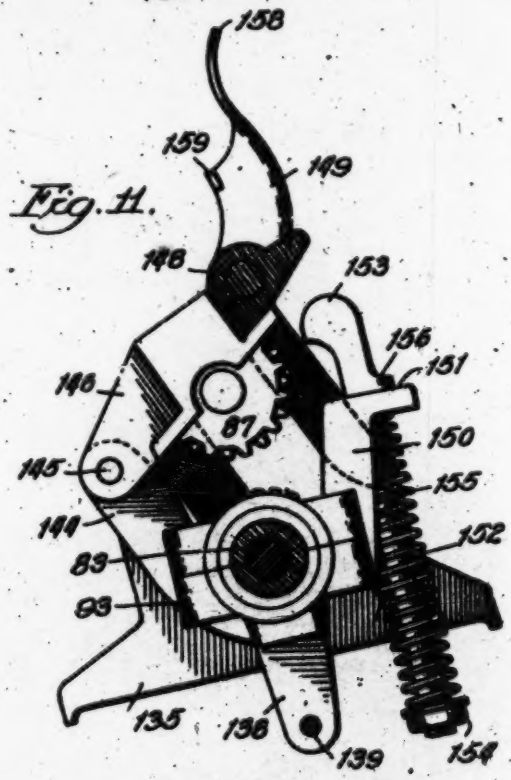


Fig. 11.



Witness:
John Enders
Merrill M. Blackburn

Inventor:
Albert J. Dremel,
by Wallace R. Lane.
Atty.

Patented Feb. 9, 1926. 1,572,002

975

UNITED STATES PATENT OFFICE.

ALBERT J. DREMEL, OF RACINE, WISCONSIN, ASSIGNOR TO THE MAYTAG COMPANY, OF NEWTON, IOWA, A CORPORATION OF IOWA.

WRINGER MECHANISM.

Original application filed February 11, 1918, Serial No. 216,436. Divided and this application filed January 12, 1920. Serial No. 350,856.

To all whom it may concern:

Be it known that I, ALBERT J. DREMEL, a citizen of the United States, residing at Racine, in the county of Racine and State of Wisconsin, have invented certain new and useful Improvements in Wringer Mechanism, of which the following is a specification.

This invention relates to wringers and associated mechanisms for the operation of the same, this application being a division of my pending application, Serial No. 216,436, filed Feb. 11, 1918.

Among the objects of my invention are to provide a wringer having an instantly releasable catch by which the clothes can be quickly released in case any article becomes entwined around the rollers or clogged therebetween; further, to provide a wringer which, by a simple movement, can be tilted to accommodate wringing in either direction, which tilting movement will automatically carry the drain board into proper position; further, to provide an adjustment to permit the wringer to be horizontally swung into any one of a plurality of adjusted positions; further, to eliminate all wood in construction; further, to reduce to a minimum the number of controlling levers; and such further objects, advantages and capabilities as will later appear.

My invention further resides in the combination, construction, and arrangement of parts illustrated in the accompanying drawings, and while I have shown therein a preferred embodiment, I desire it to be understood that the same is susceptible of modification and change without departing from the spirit of my invention.

In the drawings:

Fig. 1 is an end elevation of a wringer constructed according to my improved invention.

Fig. 2 is a front elevation at right angles to that shown in Fig. 1.

Fig. 3 is a top plan view of the same structure.

Fig. 4 is a fragmentary vertical section through the wringer gearing and mechanism for operating the cylinder.

Fig. 5 is a vertical section through the wringer gearing taken on the line 5—5 of Fig. 3.

Fig. 6 is a horizontal section through the wringer operating clutch mechanism taken on the line 6—6 of Fig. 5.

Fig. 7 is a view showing the wringer clutch, the sliding plate, and the operating disk in position, ready to be assembled.

Fig. 8 is a side elevation of the wringer gearing cover.

Fig. 9 is a vertical section taken on the line 9—9 of Fig. 5, and looking in the direction of the arrows.

Fig. 10 is a view similar to Fig. 9 but showing the top guard plate swung just prior to raising the top roller, and in position to unlock the same.

Fig. 11 is a view similar to Fig. 10, but showing the top roller in elevated position.

Referring in detail to the drawings, my improved washing machine comprises the upright frame or stand 1, having the legs 2, and carrying the tank 4. Upon the upper corner of the tank frame is the bracket 3 upon which is mounted the wringer. Suitably bolted to the bracket 3 is a second bracket 74 comprising the upper arm 75 and the lower arm 76, each of which arms is provided with suitable bearings for the sleeves 77 and 78 respectively, and in which sleeves is journaled the vertical shaft 79, loosely mounted upon which are the bevelled gears 80 and 81, which in turn mesh with the bevelled gear 82 fixed upon the shaft 83, which shaft carries the lower roller 84 of the wringer. The roller 84 is rotatably geared with the upper roll 85 through the medium of the gears 86 and 87. Rotatably mounted upon the sleeves 77 and 78 and between the arms 75 and 76 is the gear housing 88, which as seen in Fig. 6 is provided with the flat front face 89, which is recessed at 90, and to which face fits the cover plate 91, which has integrally formed therewith the outwardly extending sleeve 92, upon which is journaled the bearing 93 of the main portion of the wringer frame whereby the wringer is rotatably mounted upon the sleeve 92, as best shown in Fig. 5.

The means for reversing the direction of rotation of the wringer rolls comprise the

sleeve 92 (see Fig. 6), which is keyed to the shaft 79 and the exterior surface of which is substantially square in cross section. Slidably mounted upon this sleeve 94 is the clutch 95, which is provided with the circumferential groove 96, within which fits the plate 97, which is provided with the opening 98, within which opening is adapted to fit pin 99, which is eccentrically carried by the disc 100. This disc is fixed upon the end of the shaft 101 to rotate therewith when this shaft is rotated by a suitable manipulation of the handle 102 mounted upon the sleeve 103. From this construction, it will be seen that by throwing the handle 102 to one side or the other, the shaft 101 will be correspondingly rotated, which in turn rotates the disc 100, causing the plate 97 to be elevated or lowered, thus elevating or lowering the sliding clutch 95, the ends of which are suitably formed to engage corresponding clutch surfaces in the gears 80 and 81. These gears being located on diametrically opposite sides of the gear 82 will, as is obvious, cause the same to rotate in one direction or the other, in accordance with which of the gears 80 or 81 is being driven by the clutch 95.

In order to lock the clutch 95 in elevated or lowered position, I have provided the disc 100 with a plurality of openings 104, within any one of which may engage the tapered end 105 of the pin 106, which pin is resiliently held in engagement in said openings by the coil spring 107 mounted in the opening 108 and held between the end of the pin 106 and the inner surface of the plug 109. This, as will be apparent, is sufficient to hold these parts against any ordinary pressure or jar and yet will permit these parts to be moved upon sufficient pressure being exerted upon the handle 102. It will be noted that the shaft 101 is fixed to the sleeve 103 by means of the pin 110.

The lower arm 76 of the bracket 74 is extended downwardly to form the leg 111, which leg is suitably bored and in which is journaled the lower end of the shaft 79. This leg 111 is provided at its end with the flange 112, to which flange is suitably bolted the integral gear housing 113, which housing is provided at its opposite sides with the bearings 114 and 115, within which is journaled the shaft 116. Upon the shaft 116 is fixed the bevelled gear 117, which in turn meshes with the bevelled gear 118 fixed upon the lower end of the shaft 79. The shaft 116 projects a substantial distance beyond the end of the bearing 115 and has fixed thereupon the sprocket wheel 119, which sprocket wheel is in alinement with a sprocket wheel on a shaft 44, and over which two sprocket wheels runs the sprocket chain 120, by means of which rotation is transmitted from the drive shaft 44 to the shaft 116, and in turn to the wringer rolls 84 and 85. Suitably placed over the sprocket wheel 119 and bolted to the flange 112 by bolts 121 and to the integral housing 113 by bolts 122 is the housing 123, which is provided in its inner side with the slot 124, whereby the same may be slid in position over the bearing 115 preparatory to being bolted in place.

From the construction described above, it will be seen that the wringer is mounted for horizontal rotation upon the shaft 79 through the medium of the sleeves 77 and 78, and in order to permit the wringer to be locked in any one of a plurality of horizontal positions, the lower arm 76 of the bracket 74 is provided with a flange 125, which flange is in turn provided around its circumference with a plurality of notches 126. Extending downwardly from the cover plate 91 of the gear housing and, as best seen in Figs. 5 and 8, is the projection 127, which projection is provided with the opening 128 in line with which is the cylindrical bore 129. Slidably mounted within the opening 128 is the stem 130, which carries upon its outer end the handle 131. Encircling this stem and located within the cylindrical bore 129 is the coil spring 132, which spring is suitably compressed between the closed end of the cylindrical bore and the collar 133 secured upon the stem 130, constantly impelling this stem inwardly, whereby its tapered end 134 may be brought into engagement with any one of the notches 126 desired, thus locking the wringer in any one of a plurality of horizontal positions, whereby the same may be made to wring clothes either directly from the tank, or from a separate rinsing tub, into a separate basket, or in any other position in which it is desired to operate the same. As will be obvious, the stem 130 can be pulled outwardly by pressure exerted upon the handle 131, whereby to release the end 134 from the notches 126 preparatory to rotating the wringer into a different position.

As stated above, the wringer is mounted for vertical rotation upon the sleeve 92, whereby the wringer frame and the drain board 135, which is secured thereto at the bottom, may be quickly and suitable tilted towards either side, whereby to accommodate wringing in either direction. In order to lock the wringer in the desired one of these tilted positions, I have provided a suitable locking means which I will now describe. As shown in Fig. 8, the projection 127 of the cover plate 91 is provided with the apertures 136 and 137, and the downwardly extending leg 138 of the wringer frame is also provided with an aperture which can be brought into registry with either one of the apertures 136 or 137 upon suitable rotation of the wringer upon the

sleeve 92. Extending through the aperture in the leg 138 is the rod 139, which as shown in Fig. 2, extends at its outer end through the apertured projection 140. This rod is formed at its free end with a suitable handle 141, and at a point removed from the end with the collar 142. A coil spring 143 encircles the rod 139, and is compressed between the projection 140 and the collar 142, whereby to impel the rod 139 in a direction towards the left in Fig. 2. It will thus be seen that when the aperture in the leg 138 is brought into registry with either of the apertures 136 and 137 that the rod 139 under the action of the spring 143 will enter these apertures, and thus lock the wringer in the desired tilted position. The drain board 135 being secured to the wringer will at the same time that the wringer is tilted, be automatically thrown into proper position to accommodate wringing in the direction for which the wringer is tilted. These two positions of the wringer are indicated in Fig. 9, it being shown in full lines as tilted to one side, and in dotted lines as tilted to the opposite side.

The wringer comprises the end bearing 93, which, as explained above, is rotatably mounted upon the sleeve 92, and at its opposite end is provided with the bearing 143, between which bearings are secured, or if desired, formed integrally therewith, the the drain board 135. The lower roll 84 is journaled at one end in the sleeve 92 and at its opposite end in the bearing 143, and, as explained above, is in driving engagement with the upper roll 85 through the medium of the gears 86 and 87. Formed integrally with the lower bearing 93 is the upwardly extending arm 144, to which is pivotally connected at 145 the upper bearing 146, which at its forward end is provided with the opening 147, (see Fig. 3), there being one of these upper bearings for each end of the wringer. Rotatably connected with the upper bearings 146 by means of pins 148 passing through the openings 147 is the upper roll guard plate 149. Extending upwardly from the lower bearing 93 and on the side opposite from the arm 144 is the arm 150, which at its upper end is provided with the outwardly extending flange 151, through which flange slidably extends the rod 152, provided at its upper end with the hook 153, which hook is adapted to take over the pin 148. Encircling the rod 152 and confined between the flange 151 and a nut 154 adjustable on the lower threaded end of rod 152 is the coil spring 155, the function of which is to exert a continuous downward pressure upon the rod 152, which rod is provided near its upper end with the projection 156 for engagement with the upper side of the flange 151, whereby to limit this downward movement. By adjusting the nut 154 on the rod 152 the tension of the spring may be regulated. There is provided a similar arrangement of bolt and hook at each end of the wringer, as shown in Fig. 2. The pin 148, as best shown in Fig. 9, is slotted at 157, the function of which slot is to cause the remaining portion of the pin to act as a cam surface, whereby, as will be understood from an inspection of Fig. 9, a half rotation of pin 148 will release the hook 153 and allow the rod 152 to move downwardly under action of spring 155. This half rotation of pin 148 is effected by grasping the handle 158 of plate 149 and swinging the same through substantially one hundred and eighty degrees towards the front, thus in turn rotating pin 148 to release hooks 153, as explained above. Fig. 9 shows the plate 149 before being rotated. Fig. 10 shows this plate after being rotated approximately one hundred and eighty degrees to the front, and clearly illustrates the manner in which the hook 153 is released. Immediately upon this release of the hook, the upper bearings 146 may be swung upwardly carrying therewith the upper rolls 85, thus providing a structure which can be quickly manipulated in order to release any bunched or entangled clothes between the rolls when such is necessary. As is apparent, the upper bearings may be quickly and easily locked in operative position by a reverse operation of the parts just described. In order to hold the guard plate 142 in proper spaced relation from the upper roll, there is provided on this plate a lug 159, which comes in contact with a suitable bearing surface on the upper bearing in order to hold this plate in the desired position.

Having now described my invention, I claim:

1. In a device of the class described, a vertical power shaft, a wringer in operative relation to the power shaft, the wringer being so mounted as to enable it to be swung in a substantially horizontal plane from one position to another about the shaft as an axis and also so mounted as to swing to different positions about a horizontal axis.

2. In a device of the class described, a vertical power shaft, a wringer in operative relation to the power shaft, a drain board carried by said wringer, the wringer being so mounted so as to enable it to be swung in a substantially horizontal plane from one position to another about the shaft as an axis and also so mounted as to tilt about a horizontal axis in said swung positions, whereby to shift said drain board to accommodate wringing in either direction.

3. In a machine of the class described, a support, a shaft on the support, a wringer, rolls mounted on the wringer, means for driving the wringer rolls from the shaft and for mounting the wringer to permit it to

move about the shaft as an axis in a plurality of planes disposed angularly to each other.

4. In combination, a support, a power shaft thereon, a wringer including rolls, means for mounting said wringer on said support to permit movement of the wringer about a vertical axis and means to permit movement of the wringer about an axis perpendicular to said vertical axis, said means including a driving connection from said power shaft to said wringer rolls.

5. In a washing machine, a support, a vertical power shaft, opposed bevel gears loosely mounted thereon, an interposed clutch for selectively driving said gears, a bevel gear meshing with said opposed bevel gears, a horizontal shaft rigid with said single bevel gear, a wringer frame pivotally mounted on said horizontal shaft, wringer rolls on said wringer and a driving connection between said horizontal shaft and said rolls.

6. A wringer comprising a pair of rolls, bearings for said rolls, the upper bearing being pivotally interconnected with the lower bearing, means for maintaining said rolls in cooperative engagement, resilient means adapted to be tensioned by the contacting engagement of said rolls, and a single means for instantaneously releasing said rolls for permitting said upper bearing to be swung away from the lower bearing to separate the rolls, said means being operable to permit the operative re-engagement of said rolls without altering the adjustment of said resilient means.

7. A wringer comprising a pair of rolls, bearings for said rolls, the upper bearings being pivotally connected with the lower bearings, and means for instantaneously swinging the upper bearings away from the lower bearings, whereby to separate the rolls for the removal of bunched or entangled clothes, said means comprising a swinging plate pivoted to the upper bearings, means for locking said bearings and rolls in operative position, said last mentioned means comprising a pin and hook and resilient means adapted to be tensioned by the operative engagement of said pin and hook.

8. A wringer comprising a pair of rolls, supports for said rolls, the upper supports being pivoted to the lower supports, a pin carried by one of said supports, a hook-like member carried by the other support and adapted to engage the pin on the other support, and resilient means adapted to be tensioned by the operative engagement of said member with said pin.

9. A wringer comprising a pair of rolls, bearings for said rolls, the upper bearings being pivoted to the lower bearings, a pin in the upper bearings, and a hook resiliently mounted on the lower bearings and adapted to engage over said pin, whereby to resiliently hold said rolls together in operative position, and a swinging plate carried by said pin, said pin being so formed that upon rotation of said plate, said hook and pin will become disengaged to permit the upper bearings and roll to be swung away from the lower.

10. A wringer mechanism comprising a first support, a roll thereon, a second support, a roll thereon, means for mounting said supports to permit them to pivot relatively for effecting a relative shifting movement between said rolls from a spaced apart relation to an operative engagement, resilient means adapted to be tensioned when said rolls are operatively engaged, means for adjusting the tension of said resilient means, cooperative latching means carried by the first and second supports, and a single manually shiftable means carried by a conspicuous portion of one of said supports and operatively connected to the latching means carried by one of said supports for positively shifting said supports relatively and for bringing the rolls thereof into operative engagement against the tension of said resilient means without altering the adjustment of said resilient means.

11. A wringer mechanism comprising a support, a roll thereon, a second support, a roll carried thereby, means for shiftably mounting said supports to permit said supports and the rolls thereof to be moved relatively wide apart or to be moved together with the rolls in operative engagement, a quick release comprising a manually shiftable means carried by one of said supports and including a member adapted to be shifted entirely free of the other support to permit the rolls to be moved relatively wide apart and adapted to be moved into engagement with said other support to force the supports together and positively engage the rolls, and resilient means adapted to be tensioned when said rolls are positively engaged by the engaging movement of said manually shiftable member.

12. A wringer comprising lower bearings, a drain board extending between said bearings, a support for said wringer, a sleeve on said support, a lower roll journaled in said sleeve, one of said lower bearings being rotatably mounted on said sleeve, whereby said wringer and drain board may be rotated on said sleeve to tilt the same for accommodating wringing in either direction, and an upper roll adapted to cooperate with said lower roll.

13. In a machine of the class described, a support, a power driven shaft thereon, a wringer including rolls, means for mounting said wringer on said support to permit said wringer to be shifted so as to be disposed in various vertical planes and to permit said

wringer to be shifted into planes lying at an angle to the vertical, and means for driving said wringer rolls from said power driven shaft in shifted positions of the wringer.

14. A wringer including a pair of rolls, a vertical shaft, a support for said wringer having a horizontal sleeve upon which said wringer is journaled to permit tilting of the wringer and having a mounting to permit said support to swing about said vertical shaft, a roll shaft journaled in said sleeve, a gear on said roll shaft, and means on said vertical shaft for engagement with said gear on said horizontal shaft to operate said roll shaft in either direction.

15. In combination, a support having a vertical shaft provided with opposed bevel gears, a second support mounted to swing in a horizontal plane about said vertical shaft, said second support having a horizontal sleeve, a wringer including a pair of rolls, a roll shaft journaled in said sleeve whereby said wringer may be pivoted in a vertical plane about said shaft without interfering with the rotation of the roll, a bevel gear on said roll shaft meshing with said opposed bevel gears on said vertical shaft.

16. A bracket comprising upper and lower arms, a vertical shaft rotatably mounted in said arms, gearing on said shaft, a housing for said gearing, said housing being rotatably mounted on said shaft between said arms, and having a horizontal sleeve thereon, a wringer rotatably mounted on said sleeve, whereby said wringer may be tilted, a roll shaft journaled in said sleeve adapted to be operated by said gearing, said housing and wringer being together horizontally rotatable about said vertical shaft, and means for locking said wringer and housing in any one of a plurality of horizontally swung positions, and means for locking said wringer in tilted position.

17. A bracket including a driving element of a power transmission, a wringer support mounted on said bracket to rotate about a vertical axis, a wringer mounted on said support to rotate about a horizontal axis, said support including a driving connection from said driving element to said wringer.

18. A bracket including a driving element of a power transmission, a wringer support mounted on said bracket to rotate about a vertical axis, a wringer mounted on said support to rotate about a horizontal axis said axes intersecting and said support including a driving connection from said driving element to said wringer.

19. A bracket, a housing mounted upon said bracket for rotation in a horizontal plane, a wringer having rolls and mounted upon said housing for rotation in a vertical plane, a drain board on said wringer, shafting in said housing and wringer for operating the rolls of said wringer, means for driving said rolls in either direction, means for locking said housing and wringer in any one of a plurality of horizontal positions, and means for locking said wringer and drain board in any one of a plurality of tilted positions.

20. A wringer mechanism comprising a support, a roll thereon, a second support, a roll thereon, means for shiftably mounting said supports to permit said rolls to be moved relatively wide apart or to be moved into a position of operative engagement, a single quick release for said rolls comprising relatively movable means on said supports having completely separable portions adapted to be engaged to force said rolls together and adapted to be instantaneously and completely disengaged to permit the free and relatively wide separation of said rolls, and resilient means adapted to be tensioned when said rolls are forced into operative engagement by said cooperative portions.

21. A wringer mechanism comprising a stationary support, a roll thereon, a shiftable top support, a roll thereon, means for permanently pivoting said second support to said first support to permit said supports to be moved apart or together and to correspondingly shift said rolls from a spaced apart relation to an operative engagement, resilient means adapted to be tensioned when said rolls are operatively engaged, latching means on the stationary support, latching means on said second support, said latching means being entirely spaced apart when said respective supports are moved apart whereby to permit a relatively wide separation of said rolls, and a manually shiftable member mounted on a conspicuous portion of said top support and connected to the latching means on said top support for positively drawing said supports together against the tension of said resilient means.

22. A clothes wringer comprising an upper and a lower roll, means for pivotally mounting said rolls whereby they may be brought into operating contact or swung apart, a plate pivoted at the ends of said wringer, latching mechanism for holding said rolls together, said plate having a hand grasping portion and being shaped to operate said latching mechanism to permit the instant separation of said rolls.

23. In a power driven wringer, a vertical shaft, means for permitting the movement of the wringer about the shaft as an axis, and means for permitting the movement of the wringer about an axis perpendicular to the shaft.

24. In a wringer, a stationary frame having a roll thereon and a pair of slidable locking bolts having hooks, a frame pivoted

to said frame and carrying a roll, a shiftable top plate having spaced pivots in said shiftable frame adapted to engage or release the hooks of said locking bolts on movement of said plate.

25. In a power driven wringer, a vertical shaft, a frame rotatably mounted for movement about the shaft as an axis, wringer mechanism in said frame, and means for mounting said frame for tilting movement about a horizontal axis extending lengthwise of said frame.

26. In a power driven wringer, a vertical shaft, a roller carrying frame rotatably mounted for movement about the shaft as an axis, said frame being also rotatably mounted for movement about an axis extending perpendicularly to the shaft and longitudinally of the frame to permit lateral tilting of the frame, and means for securing said frame in various of the positions to which it may be moved.

27. In a wringer, a frame, a roll thereon, a second roll adapted to be superimposed in operative engagement with said first roll, means including a guard plate normally positioned over said top roll and pivotally connected to said frame, said guard plate being shiftable relatively to said frame whereby to expose said top roll and mechanism for latching said plate to the frame, said mechanism including a single means for instantaneously releasing said latching mechanism.

28. A wringer comprising a first support, a wringer roll carried thereby, a second support, a wringer roll thereon, said second support being pivotally connected to said first support to permit said pivoted support to be swung and shift the roll carried thereby to a position spaced from the roll of said first support or to permit said rolls to be brought together into operative engagement, a single shiftable instantaneously releasable means carried by said second support adapted to engage cooperative means on said first support to maintain said supports in closed position with the rolls in contact and tension means mounted solely on said first support and compressed by the closing of said supports and tending normally to prevent the separation of said rolls when in contacting position.

29. A wringer comprising a first support, a roll carried thereby, a second support, a roll carried thereby, means for pivotally interconnecting said supports to permit them to move relatively whereby to shift the rolls from a relatively wide spaced apart relation to an operative engagement, resilient means adapted to be tensioned when said rolls are brought into contact, latching means having a substantially hook-shaped portion carried by one of said supports, a cooperative latching means on the other support and adapted to be engaged by the substantially hook-shaped portion when said supports are brought together and to be entirely free of said cooperative latching member when said supports are separated, and a single manually operable member adapted to shift said substantially hook-shaped portion relatively to its support when in engagement with its cooperative member to positively force said rolls into operative engagement against the tension of said resilient means.

30. In a washing machine, a support, a wringer, rolls for said wringer, a power shaft on said support, means for driving said rolls from said power shaft, and means for mounting said wringer on said support to permit it to swing to various positions and to move while maintained in a swung position.

31. A wringer comprising a first support, a roll thereon, a second support, a roll thereon, means for pivotally interconnecting said supports to permit one to swing upon the other so as to permit one of said rolls to swing entirely free of the other roll and its support or to permit said rolls to be operatively engaged, a single shiftable instantaneously releasable means carried by one of said supports adapted either to maintain said rolls operatively engaged or to permit the quick release of said rolls and the substantial swinging movement of one of said rolls away from the other roll to expose said roll, and resilient means adapted to be tensioned when said rolls are brought into contact, said quick releasable means being constructed and arranged to permit its resetting and the operative engagement of said rolls without changing the adjustment of the resilient means.

32. A wringer comprising a lower support, a roll thereon, an upper support, a roll thereon, means for pivotally mounting said upper support on said lower support to permit said upper support to swing on said lower support and arcuately to swing said upper roll into operative engagement with said lower roll or out of engagement with said lower roll to remotely separate said rolls, resilient means adapted to be tensioned when said rolls are brought into engagement, and a single instantaneously releasable means carried by a conspicuous portion of one of said supports and adapted to maintain said rolls in operative engagement, said resilient means and said releasable means being constructed and arranged on said supports to permit the operative reengagement of said rolls without changing the adjustment of said resilient means and the arcuate movement of one of said rolls away from the other to a substantially removed position.

33. In a wringer, a stationary frame, a roll thereon, a second roll adapted to be superimposed in operative engagement with

said first roll, means including a top plate normally positioned over said top roll and pivotally connected to said frame, said top plate being shiftable relatively to said frame whereby to expose said top roll, and mechanism for latching said top plate to the frame, said mechanism including a single quick releasing means for instantaneously releasing said latching mechanism and resilient means adapted to be tensioned by the latching of said plate to said frame.

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In witness whereof, I hereunto subscribe my name to this specification.

ALBERT J. DREMEL.

1316 (Defendant's Exhibit 5, Letters Patent No. 1,611,767 to E. D. Misner, December 21, 1926.)

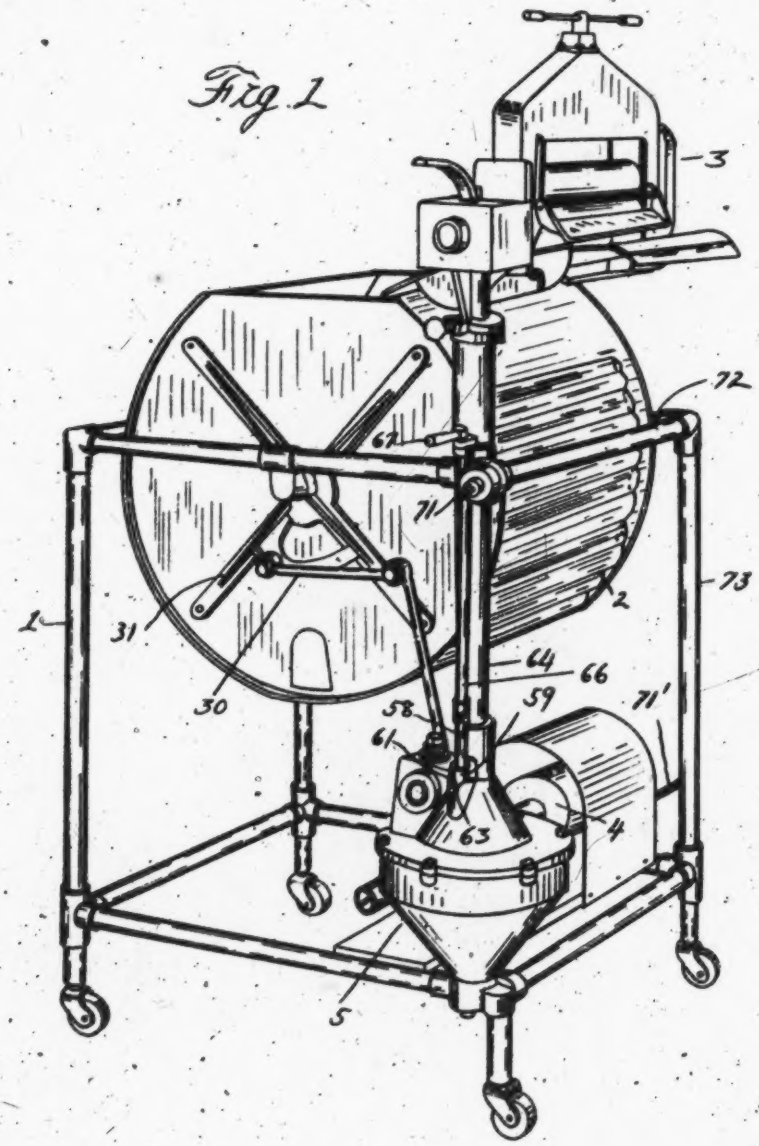
984 Dec. 21, 1926. 1,611,767

E. D. MISNER

DRIVE MECHANISM FOR WASHING MACHINES

Filed May 15, 1922 4 Sheets-Sheet 1

Fig. 1



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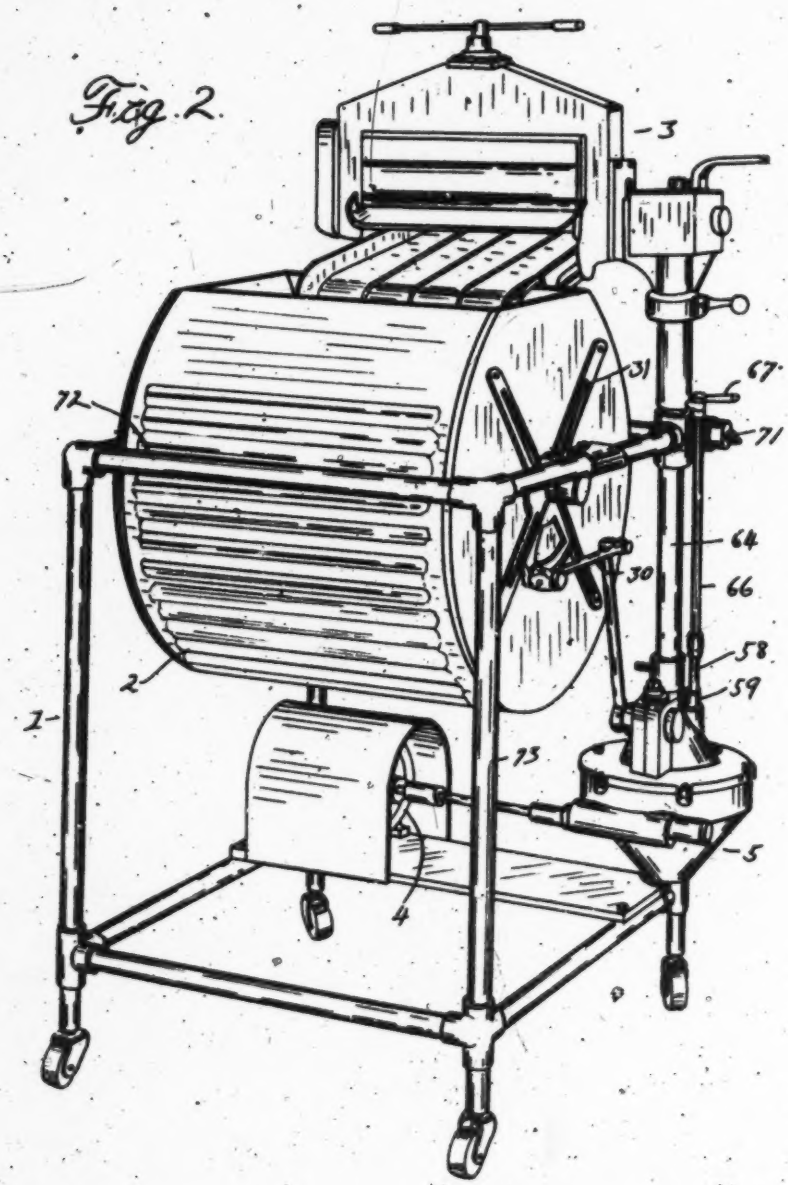
DRIVE MECHANISM FOR WASHING MACHINES

Filed May 15, 1922 4 Sheets-Sheet 2

Fig. 2.



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Dec. 21, 1926. 1,611,767

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DRIVE MECHANISM FOR WASHING MACHINES

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Fig. 3.

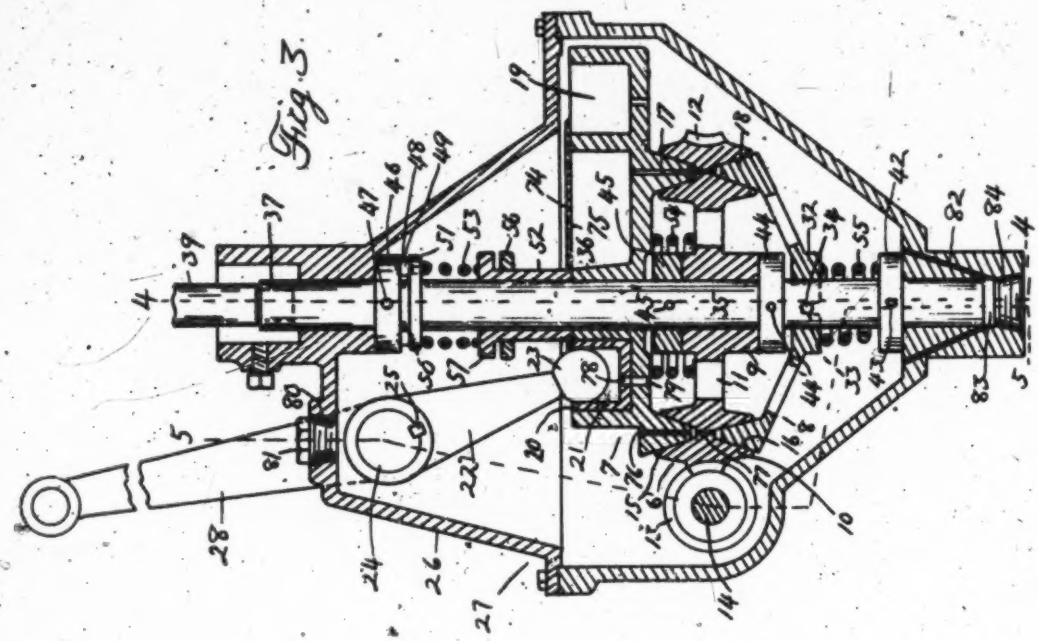
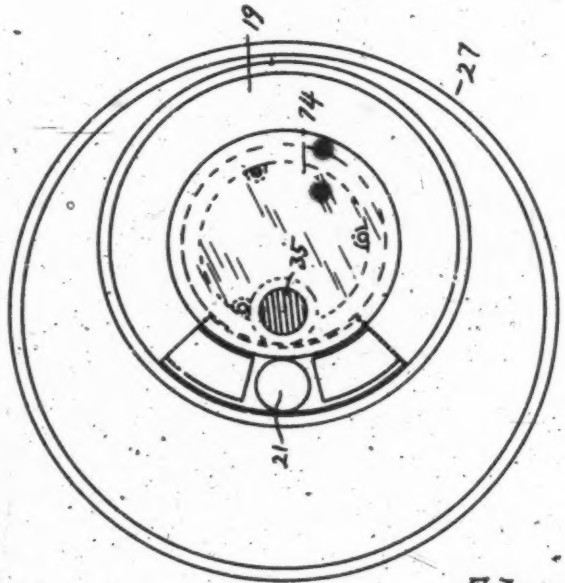


Fig. 6.



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DRIVE MECHANISM FOR WASHING MACHINES

Filed May 15, 1922 4 Sheets-Sheet 4

Fig. 5.

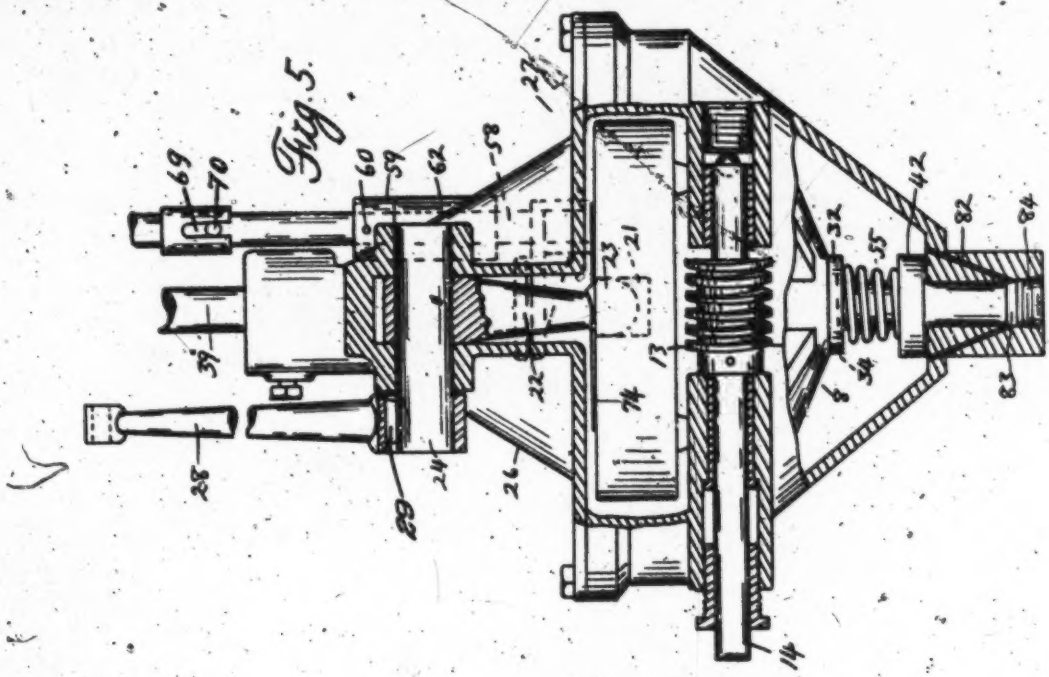
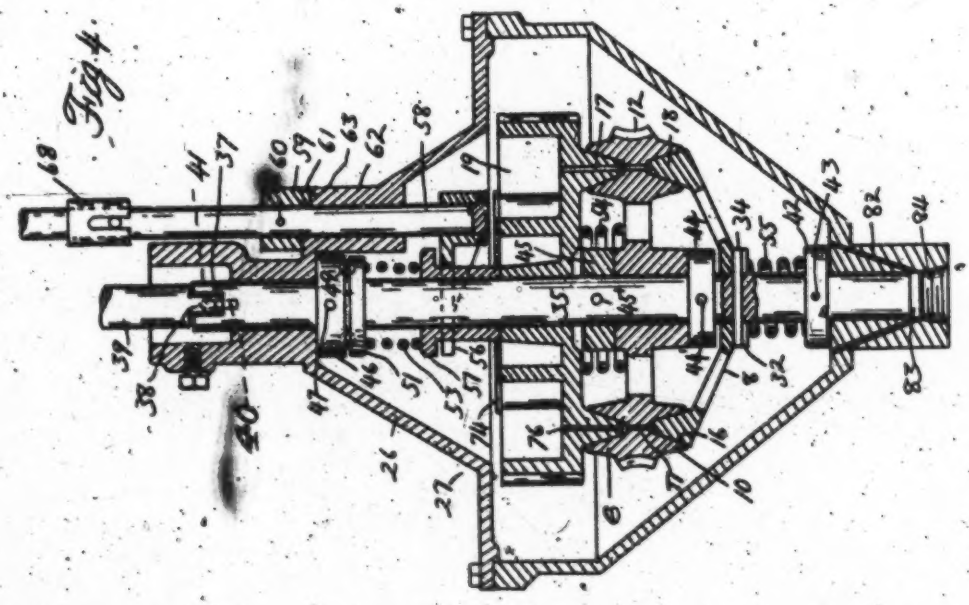


Fig. 4.



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Patented Dec. 21, 1926. 1,611,767

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UNITED STATES PATENT OFFICE.

EDGAR D. MISNER, OF DETROIT, MICHIGAN, ASSIGNOR, BY MESNE ASSIGNMENTS, TO UNIVERSAL APPLIANCES INC., OF DETROIT, MICHIGAN, A CORPORATION OF MICHIGAN.

DRIVE MECHANISM FOR WASHING MACHINES.

Application filed May 15, 1922. Serial No. 560,964.

The invention relates to washing machines and refers particularly to the drive mechanism therefor. The invention has among its objects the provision of a washing machine which is efficient in operation, simple in construction, and can be cheaply manufactured; the provision of a frame for the washing machine which encloses the wiring extending between the electric motor and the control switch; the provision of a clutch including a driving clutch member and a pair of driven clutch members adapted to be operatively connected thereto independently of each other; the provision of a cam groove in one of the driven clutch members engageable in by the tub actuating lever; the provision of a shaft adapted to be operatively connected to the wringer rolls and to the second driven clutch member, this shaft forming the bearing for the driving clutch member and the first-mentioned driven clutch member; and the provision of a housing for the clutch which constitutes a part of the washing machine frame.

With these as well as other objects in view, the invention resides in the novel features of construction and combination and arrangements of parts as more fully hereinafter set forth.

In the drawings:

Figures 1 and 2 are perspective views of a washing machine embodying my invention;

Figure 3 is a longitudinal cross section through the clutch mechanism;

Figures 4 and 5 are respectively cross sections on the line 4—4 and 5—5 of Figure 3;

Figure 6 is a plan view of the clutch mechanism with the upper part of the housing and the mechanism above the upper driven clutch member removed.

1 is the frame of the washing machine, 2 the rockable tub journalled at its ends upon the frame, and 3 the wringer rotatable through a horizontal path above the tub. 4 is the electric motor mounted upon the frame near one corner thereof and below the tub and adapted to actuate both the tub and wringer through the clutch mechanism within the housing 5.

This mechanism comprises the rotatable driving clutch member 6 and the cooperating axially aligned rotatable upper and lower driven clutch members 7 and 8 respectively for actuating the tub 2 and wringer 3. The driving clutch member 6 has the hub 9 and the rim 10 connected to the hub by the integral spokes 11. Upon the periphery of the rim is the worm gear 12, the teeth of which intermesh with the teeth of the worm 13 mounted upon the driving shaft 14 which is coupled to the drive shaft of the electric motor 4. The rim 10 also has in its sides the oppositely disposed annular V-shaped grooves 15 and 16 for engagement in by the annular V-shaped flanges 17 and 18 respectively upon the driven clutch members 7 and 8 by means of which the driven clutch members are rotated from the driving clutch member.

The upper driven clutch member 7 has the annular cam groove 19 in its upper face which is eccentric to the axis of rotation of the driven clutch member. 20 is a segmental shoe slidably engaging in the groove and provided with the transverse cylindrical recess 21. 22 is a pivoted tub actuating lever having the spherical head 23 at its free end fitting in the recess 21 of the shoe, there being sufficient clearance between this spherical head and the base of the cylindrical recess to permit of the necessary longitudinal movement of the head in the recess while the lever is being laterally swung from one end of its travel to the other during the rotation of the upper driven clutch member. This lever is non-rotatably secured to the pin 24 as by means of the key 25 and the pin is journalled in the side walls of the enlargement 26 upon the upper section of the housing 27. One end of the pin extends outwardly beyond one of the side walls and is non-rotatably secured to the lever 28 as by means of the key 29, the free end of this lever being pivotally connected to the link 30, the opposite end of the latter being pivotally connected to the reinforcement 31 at one end of the tub 2.

The lower driven clutch member 8 which is preferably connected to the annular V-shaped flange 18 by spokes, has the hub 32. The lower end of this hub has the diametrically opposite recesses 33 for engagement by a transverse pin 34 upon the vertical shaft 35. This shaft extends upwardly through the hub 9 of the driving clutch member 6 and also through the hub 36 of the upper driven clutch member 7, both of these hubs

being rotatable upon the shaft. This shaft is journalled at its lower end in the lower section of the housing 27 and near its upper end in the upper section of the housing 27 and has at its upper end the bifurcations 37 between which extends the tongue 38 of the wringer driving shaft 39 adapted to be operatively connected to the wringer rolls by the usual reverse gearing. To center the lower end of the wringer driving shaft 39 and the upper end of the shaft 35, there is the axial pin 40 extending upwardly between the bifurcations 37 and engaging in the axial recess 41 in the lower end of the shaft 39.

42 is a collar bearing upon the lower end of the lower section of the housing 37 and secured to the shaft 35 near its lower end by the transverse pin 43. 44 is a second collar engageable with the lower end of the hub 9 of the driving clutch member 6 and secured to the shaft 35 by the transverse pin 44'. 45 is a third collar engageable with the upper end of the hub 9 of the driving clutch member and secured to the shaft 35 by the transverse pin 45'. 46 is a fourth collar bearing against the upper end of the upper section of the housing 27 and secured to the shaft 35 by the transverse pin 47. These four collars are alike with the exception that the upper or fourth collar 46 has the annular groove 48 in its lower face for engagement in by the balls 49 of an anti-friction bearing which also engage in an annular groove 50 in the upper face of the washer 51 surrounding the shaft 35. 52 is a thrust bearing surrounding the shaft 35 and engageable with the upper end of the hub 36 of the upper driven clutch member 7, and 53 is a coil spring abutting the washer and the thrust bearing for yieldably forcing the upper driven clutch member 7 into driving engagement with the driving clutch member 6. 54 is a second coil spring surrounding the shaft 35 and abutting the driving clutch member 6 and the upper driven clutch member 7, this spring being of sufficient strength to raise the upper driven clutch member out of driving engagement with the driving clutch member when the downward pressure of the coil spring 53 is relieved. 55 is a third coil spring abutting the collar 42 and the hub 32 of the lower driven clutch member 8 for yieldably forcing the lower driven clutch member into driving engagement with the driving clutch member.

To relieve the upper driven clutch member 7 from the downward pressure exerted by the coil spring 53, there is the yoke 56 embracing the thrust bearing 52 and located below its outwardly extending annular flange 57 at its upper end. This yoke is suitably secured to the vertically extending rod 58 which extends upwardly through the upper section of the housing 27 parallel and adjacent to the shaft 35 and has the cam member 59 secured thereto as by means of the transverse pin 60. This cam member has the depending V-shaped cam 61 engageable with the upper end of the boss 62 upon the upper part of the housing 27, the upper end of this boss being provided with the V-shaped groove 63 which is engageable by the cam 61 to permit of downward movement of the rod 58 and yoke 56 sufficiently to permit of the coil spring 53 exerting its downward pressure upon the thrust bearing 52 and upper driven clutch member 7. However, upon rotation of the rod 58, the cam 61 rides out of the groove 63 and upwardly upon the end of the boss 62 thereby raising the rod and yoke as well as the thrust bearing, and consequently compressing the coil spring 53. As soon as this occurs, the coil spring 54 yieldably raises the upper driven clutch member out of driving engagement with the driving clutch member.

The housing 27 is located at one corner of the frame 1 of the washing machine and supports the vertical tubular leg 64 of the frame, the lower end of this leg engaging in the upper end of the upper section of the housing and being secured thereto by suitable means such as the set screw 65. This tubular leg 64 extends axially of the shaft 35 and preferably surrounds the upper end thereof. Also, the wringer driving shaft 39 extends upwardly through this tubular leg so that the latter in addition to forming a part of the frame of the washing machine, houses part of the drive mechanism.

To rotate the rod 58 which controls the driving of the upper driven clutch member 7, there is the upper rod 66 extending substantially parallel and adjacent to the tubular leg 64 and having at its upper end the handle 67 adjacent to the bearing of the rod upon the frame. The lower end of this rod is non-rotatably secured to the rod 58, but permits of relative longitudinal movement thereof which is accomplished by securing the nut 68 to the lower end of the upper rod and providing this nut with the longitudinally extending slots 69 which are slidably engaged by the pins 70 extending transversely from the rod 58.

The electric switch 71 for controlling the motor is also located at the same corner of the washing machine and adjacent to the handle 67. The wiring 71' running from this switch to the electric motor passes through the upper horizontal tubular member 72 at one side of the frame and through the vertical tubular leg 73 forming part of the frame 1 and out through an opening near the lower end of this tubular leg. This tubular leg is at the corner of the frame near which the electric motor is mounted.

To retain the segmental shoe 20 within the cam groove 19 so that it cannot move verti-

cally relative to the upper driven clutch member 7, I have provided the plate 74 secured to the upper face of the upper driven clutch member and extending slightly over the cam groove to engage the upper edge of the shoe, this plate, however, not interfering with the movement of the spherical head 23 upon the tub actuating lever.

To lubricate the friction surfaces of the different members within the housing 27, the plate 74 is provided with the apertures 75 and the annular flange 17 upon the upper driven clutch member 7 has the vertically extending passageways 76 therethrough. Also, the rim 10 of the driving clutch member 6 has the vertical passageways 77 extending therethrough between the annular V-shaped grooves 15 and 16 therein. Furthermore, the base of the shoe 20 and that portion of the upper driven clutch member forming the base of the cam groove 19 are apertured at 78 and 79 respectively for the passage of the lubricant. The upper section of the housing 27 has the threaded opening 80 for permitting of the insertion of the lubricant into the housing, this opening being normally closed by the plug 81. To permit of draining the lubricant out of the housing, I have provided the lubricant passageways 82 in the lower end of the lower section of the housing and opening into the housing beyond the lower collar 42 and into the bore 83 below the lower end of the shaft 35. This bore is normally closed by the plug 84.

What I claim as my invention is:

1. In a drive mechanism for washing machines, the combination with a rotatable driving clutch member, of a cooperating rotatable driven clutch member, a pivoted lever having a cam engagement with said driven clutch member, a second rotatable driven clutch member cooperating with said driving clutch member, and a shaft extending through said first-mentioned driven clutch member and said driving clutch member and secured to said second mentioned driven clutch member.

2. In a drive mechanism for washing machines, the combination with a frame for a washing machine including a vertically extending leg, of a rotatable driving clutch member, a cooperating rotatable driven clutch member, and a shaft connected to said driven clutch member and extending upwardly within said vertically extending leg.

3. In a drive mechanism for washing machines, the combination with the frame for a washing machine including a vertically extending tubular member, of a rotatable driving clutch member, a cooperating rotatable driven clutch member, a member actuated from said driven clutch member, and a housing for inclosing said clutch members, carrying said vertically extending tubular member.

4. In a drive mechanism for washing machines, the combination with a rotatable driving clutch member, of a cooperating rotatable driven clutch member having an eccentric groove, a segmental shoe slidably engaging in said groove and provided with a transverse recess, and a pivoted lever having a spherical head at one end thereof engaging in said recess.

5. In a drive mechanism for washing machines, the combination with a rotatable driving clutch member, of a cooperating rotatable driven clutch member having a cam groove, a shoe slidably engaging in said groove, a lever connected to said shoe, and means for retaining said shoe in said groove.

6. In a drive mechanism for washing machines, the combination with a rotatable driving clutch member, of a cooperating rotatable driven clutch member having an eccentric groove, a segmental shoe slidably engaging in said groove and provided with a transverse recess, a pivoted lever having a spherical head at one end thereof engaging in said recess, and means upon said driven clutch member for maintaining said shoe in engagement with said groove.

7. In a drive mechanism, the combination with a rotatable driving clutch member, of a cooperating rotatable driven clutch member having a cam groove, a shoe slidably engaging said groove, a lever connected to said shoe, and a member secured to the driven clutch member for retaining said shoe in said groove.

In testimony whereof I affix my signature.

EDGAR D. MISNER.

(Defendant's Exhibit 6, Letters Patent No. 1,748,442 to G. L. Davis, February 25, 1930.)

996 Feb. 25, 1930. G. L. DAVIS 1,748,442

WASHING MACHINE

Filed Aug. 28, 1924 2 Sheets-Sheet 1

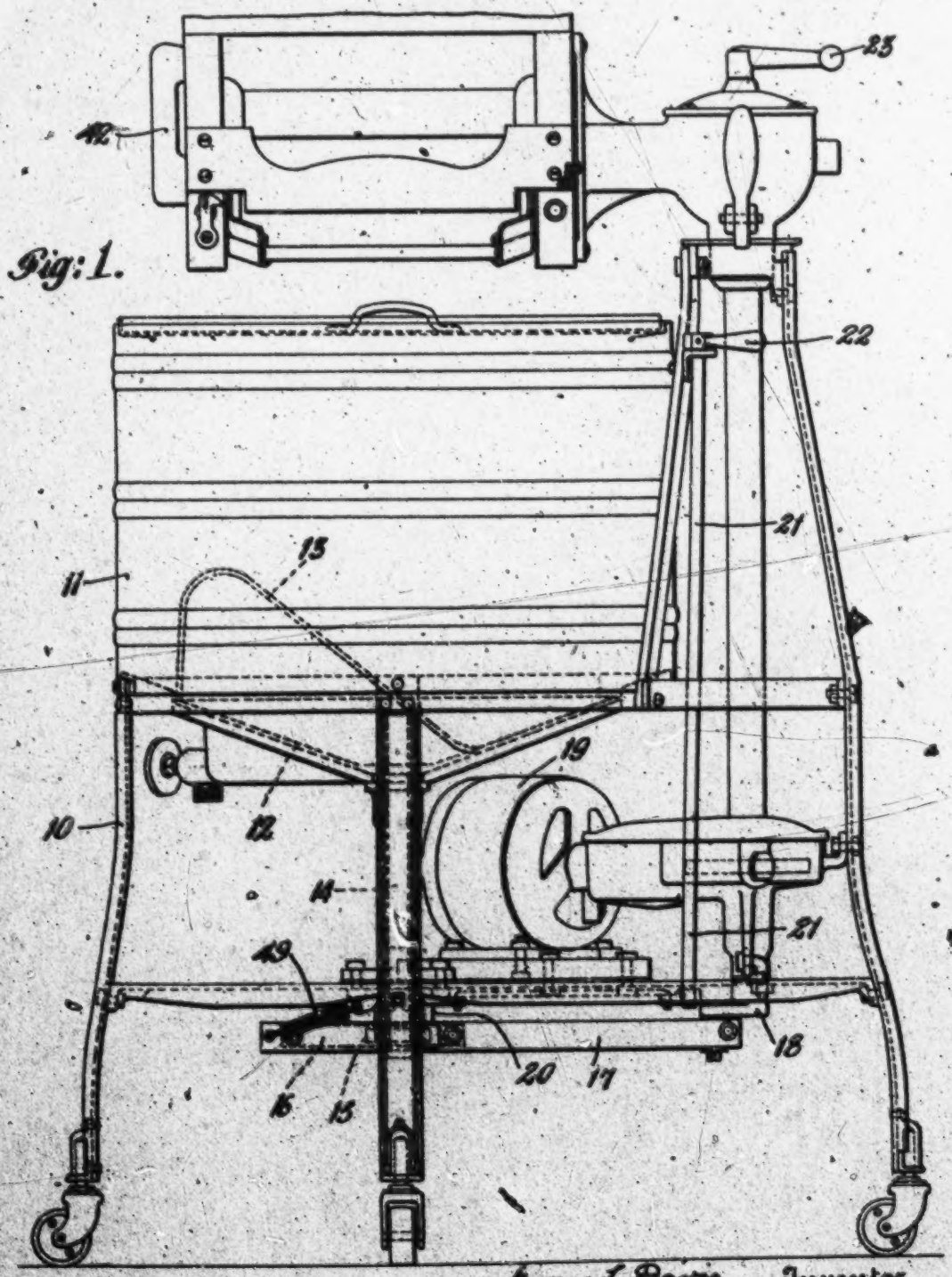


Fig: 1.

George L. Davis Inventor

By his Attorney
Merrell E. Clark

998 Feb. 25, 1930. G. L. DAVIS 1,748,442

WASHING MACHINE

Filed Aug. 28, 1924 2 Sheets-Sheet 2

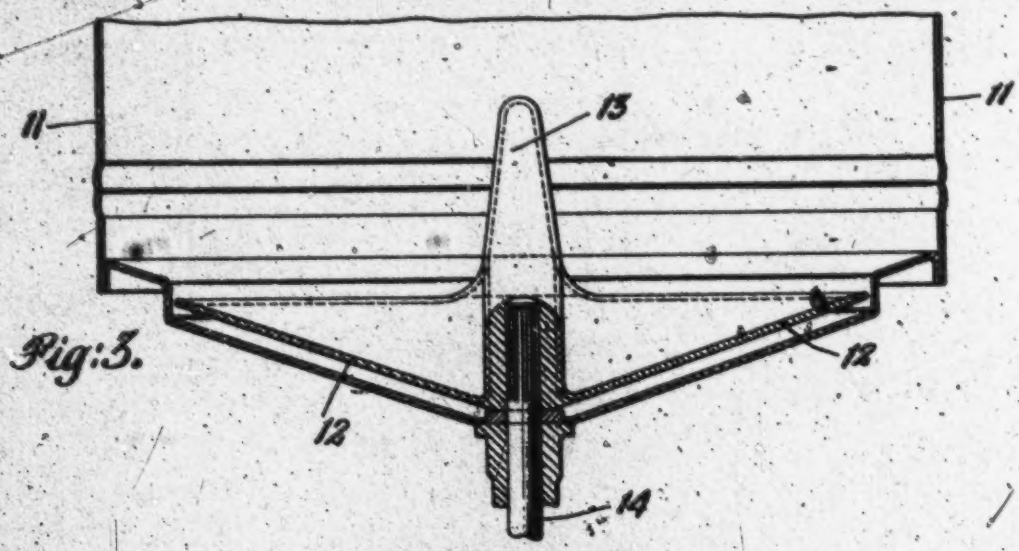
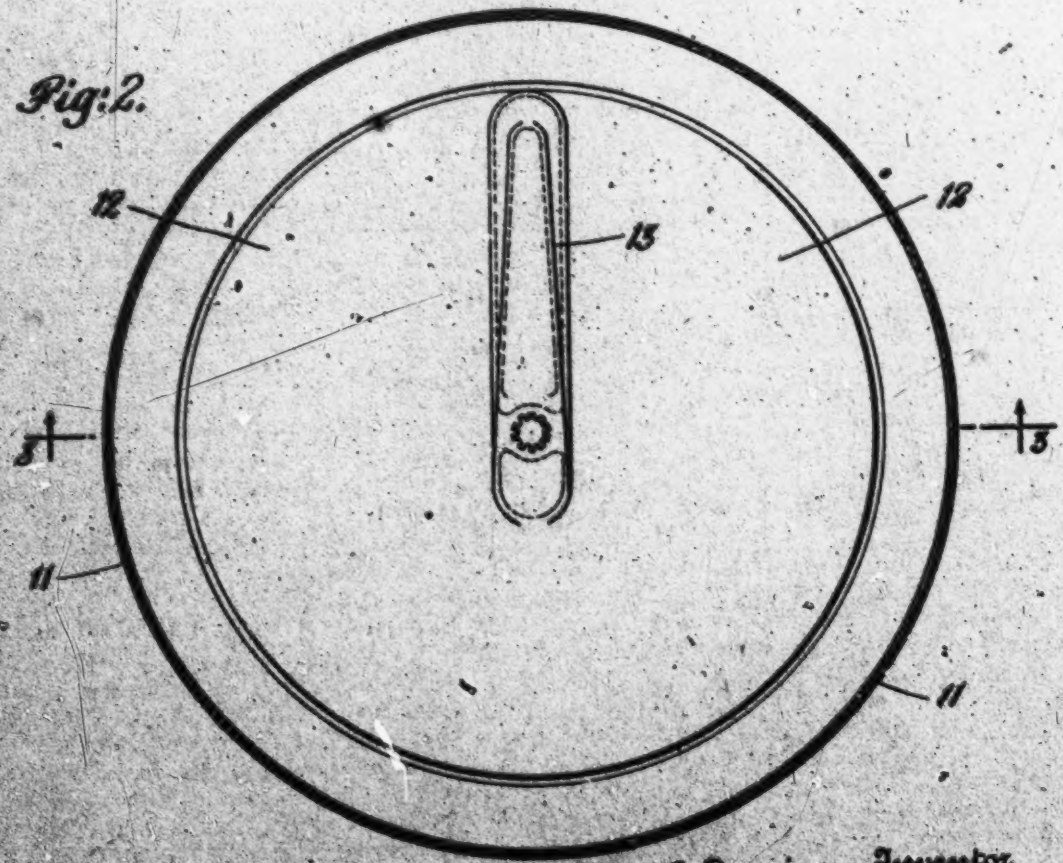


Fig:3.

Fig:2.



George L. Davis Inventor

By his Attorney
Murrell C. Clark

UNITED STATES PATENT OFFICE

GEORGE L. DAVIS, OF BINGHAMTON, NEW YORK, ASSIGNOR TO NINETEEN HUNDRED CORPORATION, OF BINGHAMTON, NEW YORK, A CORPORATION OF NEW YORK

WASHING MACHINE

Application filed August 28, 1924. Serial No. 734,894.

This invention relates to domestic washing machines of the agitator type, and particularly to such machines, in which the oscillating agitator is below the clothes instead of above them.

A machine of this general type is disclosed in U. S. Patent No. 1,496,305, June 3, 1924, to Doughty and Davis. In that patent the advantages of a "submerged agitator" as compared to an overlying agitator are pointed out. And it is also pointed out that if the vanes upon the submerged agitator are symmetrically arranged, there results a marked tendency for a single one of the many pieces of laundry in the tub to cling to the agitator, thus interfering with the efficiency of the machine in washing. To overcome this difficulty, those patentees provided an agitator having a number of radial vanes on its upper surface, arranged unsymmetrically, as, for example, by leaving a greater space between two of them than between any other two.

The object of the present invention is to provide a submerged agitator which will possess all of the advantages of the agitator of the aforesaid patent, and at the same time give increased agitation to the contents of the tub.

A further object of the invention is to provide a submerged agitator which shall be easy and economical to make, and which will minimize the wear and tear upon the clothes with which it comes in contact in the washing operation.

Further objects and advantages of the invention will appear hereinafter.

In the accompanying drawing which illustrates one embodiment of the present invention, Fig. 1 is a front elevation of the machine as a whole, Fig. 2 is a horizontal cross section of the tub and agitator, looking down upon it, and Fig. 3 is a vertical section taken on the line 3—3 of Fig. 2.

The machine shown in Fig. 1 of the drawing comprises a suitable frame 10 upon which is mounted the stationary tub 11. This tub is preferably made of sheet metal, though, of course, wood may be employed. Also mounted upon the frame 10 is the wringer 12 which may be of any desired type, but preferably it is arranged to swing about its vertical driving shaft as an axis.

At the bottom of the tub 11, as best shown in Figs. 2 and 3, is the agitator 12 which is mounted removably—preferably splined—upon its actuating shaft 14.

Any suitable means may be provided for oscillating the shaft 14. As here shown, these means include the pinion 15 mounted upon the shaft and the rack 16 mounted upon the connecting rod 17. The connecting rod is reciprocated by the crank 18, which is driven through suitable gearing from the motor 19.

Normally the spring 49 holds the connecting rod in position so that the rack 16 is in mesh with the pinion 15 and so that the shaft 14 and agitator 12 are oscillated through the power transmitted through the connecting rod 17. However means, under the control of the operator, such, for example, as are indicated at 20, 21 and 22, are provided for moving the connecting rod away so that the rack 16 is free of the pinion 15, when it is desired to stop the agitator.

The wringer is preferably operated by the motor 19, also, through gearing which may be controlled in a well known manner through the wringer clutch-handle 23.

Coming now to the construction of the agitator 12 itself, it is preferably, though not necessarily, in the form of an inverted cone. And it has but a single major vane 13. The contour and arrangement of this vane is the result of much experimentation. And it has been found that by employing a submerged agitator, with but a single major vane, shaped in general like the one shown, remarkable efficiency is attained.

It will be understood, of course, that the efficiency of any washing machine depends not only upon the degree of agitation produced within the tub, but also upon the extent to which all of the clothes within the tub are subject to that agitation. For example if, in the machine illustrated, the clothes remained throughout the washing operation in the same relation to each other [illegible] the top clothes remained on top and the bottom ones on the bottom, etc., the efficiency of the

machine as a whole would be low. It is therefore necessary, for the highest efficiency, that the agitator, by its oscillations shall set up currents of water which will move the clothes from top to bottom of the tub, and vice versa, as well as currents following generally the direction of movement of the agitator itself.

The agitator 12 shown in the drawing with its single vane 13, fulfills all of the requirements. As will be noted the vane 13 is highest at the outer periphery of the agitator and its height decreases gradually from there to its inner end, just beyond the center. The vane is of sufficient width to give it the requisite stability and to avoid anything in the nature of sharp edges which might injure the clothing. As shown, all of its surfaces are rounded. Also its width gradually increases from top to bottom.

No attempt is here made to explain, in detail, the mechanical and hydraulic principles upon which the operation of this novel agitator depends. Suffice it to say that this agitator does, in fact, produce currents or eddies of such a kind and in such directions that all of the clothes are subjected to extremely efficient agitation and washing. There is no tendency for any of the clothes to remain in contact with the agitator an excessive length of time, but on the other hand all of the clothes are constantly being moved from top to bottom and vice versa, as well as in a horizontal direction. While I do not wish to be bound by any particular theory of operation of my improved device it is my opinion that there are two reasons why my agitator with a single major vane overcomes satisfactorily the tendency of particular pieces of clothing to cling to the agitator. The first is that the single major agitator produces a strong, concentrated current which brings to bear a strong force acting in a definite direction to remove the clothing from the agitator, whereas the well known multi-vane agitators set up a number of diverse currents whose combined effect is not to remove the clothing from the agitator, but on the contrary, to hold it on the agitator. The second of these reasons is that the rapid reversals of movement of the agitator has a tendency to throw the clothing off from the single major vane, whereas when a multi-vane agitator is used the throwing off of clothing from one vane, if it occurs at all, is generally followed by its being caught by other vanes. The overcoming of this tendency of the clothes to cling to the agitator not only makes for efficient washing, but also eliminates the extremely hard wear to which garments are subjected when they cling to the rapidly oscillating agitator.

While I have shown but one particular form of agitator embodying my invention, and but one form of washing machine equipped with such an agitator, it is to be understood that my invention is not limited to this exact form of agitator or to any particular form of washing machine. On the contrary, many changes may be made in the disclosure hereof without departing from my invention. For example, agitators embodying my invention may be provided with smaller vanes in addition to the vane here shown, which I term the "major vane." So also the surface of the agitator itself may be modified as may the particular shape of the major vane. Again, although I have here shown my invention as applied to a stationary tub machine, it is applicable also to machines in which the tub oscillates, the bottom of the tub itself being provided with a vane and constituting the agitator. The term "agitator" as used in the claims is intended to cover agitators formed integral with the tub or container, as well as separate agitators. There are many similar variations within the scope of my invention, which will occur to those skilled in the art.

In certain of the appended claims the agitator is described as acting upon the contents of the container to cause them to move "up and down and from one side to the other of the container". This description of the movement of the tub contents is intended to differentiate from the symmetrical movement produced by an agitator which has a plurality of symmetrically arranged blades of equal size (four, for example), and which instead of causing the contents to move from one side to the other of the container, causes those contents to move centrifugally and centripetally.

What I claim is:

1. In a washing machine, a container, an agitator located therein, and means for actuating said agitator, said agitator including a single major vane extending from approximately the center of the agitator to approximately its outer edge.

2. In a washing machine, a container, an agitator located therein, and means for actuating said agitator, said agitator including a single major vane extending, and gradually increasing in height, from approximately the center of the agitator to approximately its outer edge.

3. In a washing machine, a container, an agitator located adjacent the bottom thereof, and means for actuating said agitator, said agitator including upon its upper surface a single major vane extending from approximately the center of the agitator to approximately its outer edge.

4. In a washing machine, a container, an agitator located adjacent the bottom thereof, and means for actuating said agitator, said agitator including upon its upper surface a single major vane extending, and gradually increasing in height, from approximately the

center of the agitator to approximately its outer edge.

5. In a washing machine, a container, an agitator located adjacent the bottom thereof, and means for actuating said agitator, said agitator including upon its upper surface a single major vane extending from approximately the center of the agitator to approximately its outer edge, said major vane gradually increasing in width from top to bottom.

6. In a washing machine, a container, an agitator located adjacent the bottom thereof, and means for actuating said agitator, said agitator including upon its upper surface a single major vane extending, and gradually increasing in height, from approximately the center of the agitator to approximately its outer edge, said major vane gradually increasing, also, in width, from top to bottom.

7. In a washing machine, a container, an agitator located adjacent the bottom thereof, and means for actuating said agitator, said agitator having a conical surface and including a single major vane extending, and gradually increasing in height, from approximately the center of the agitator to approximately its outer edge.

8. In a washing machine, a container, an agitator located adjacent the bottom thereof, and means for actuating said agitator, said agitator being in the form of an inverted cone and being provided with a single major vane extending, and gradually increasing in height, from approximately the center of the agitator to approximately its outer edge.

9. In a washing machine, a container, an agitator located adjacent the bottom thereof, and means for actuating said agitator, the upper surface of said agitator being in the form of an inverted cone and being provided with a major vane extending and gradually increasing in height from approximately the center of the agitator to approximately its outer edge, said major vane gradually increasing, also, in width from top to bottom.

10. In a washing machine and the like, a body portion having a smooth surface, and an impelling projection extending from said surface and located to one side of the central part of said surface, the remainder of said surface being smooth and free of projections.

11. In a washing machine, an agitator member comprising a plate having a smooth surface, a single blade extending along a line in said surface between the central and edge portions of the plate and substantially normally to the surface of the plate.

12. In a washing machine, the combination of a tub and an alternately rotatable agitator comprising an eccentrically located single major impeller for acting upon the contents of the tub.

13. In a washing machine having a tub and operating means, an alternately rotatable agitator in the tub and operatively connected to said means, said agitator having a single major blade and being concaved and arranged in inverted position to present the blade and the concaved portion thereof to the contents of the tub.

14. In a washing machine having a container for holding a cleansing fluid and material to be cleansed, an agitator in the container, means for alternately rotating the agitator, said agitator having a single major eccentric means extending from the agitator for acting upon the contents of the container to cause a movement of the contents up and down and from one side to the other side of the container.

15. In a washing machine having a container for holding a cleansing fluid and material to be cleansed, an agitator in the container, means for alternately rotating the agitator, said agitator having a single major blade extending from the face of the agitator and arranged to effect a movement of the contents up and down and from one side to the other side of the container.

16. In a washing machine having a container for holding a cleansing fluid and material to be cleansed, an agitator in the container, means for alternately rotating the agitator, said agitator having a single major blade of substantial axial width and arranged to effect a movement of the contents up and down and from one side to the other side of the container.

17. In a washing machine having a container for holding a cleansing fluid and material to be cleansed, an agitator in the container, means for alternately rotating the agitator, said agitator having a single major impelling blade extending along a radius of the agitator and having a substantial axial width to effect movement of the contents up and down and from one side to the other side of the container.

18. In a washing machine having a container for holding a cleansing fluid and material to be cleansed, an agitator in the container, means for alternately rotating the agitator, said agitator having a single major impelling blade substantially parallel to the axis of rotation of the agitator and eccentrically thereto to effect a movement of the contents up and down and from one side to the other side of the container.

19. In a washing machine, a container and an agitator located adjacent the bottom of the container, said agitator comprising an alternately rotatable member having a single asymmetrically disposed impelling portion extending upwardly therefrom.

20. In a washing machine, a container, an agitator located therein, and means for actuating said agitator, said agitator including a single major vane extending from approximately the center of the container toward its outer wall.

21. In a washing machine, a container, an agitator located adjacent the bottom thereof, and means for actuating said agitator, said agitator including a single major vane extending from approximately the center of the container toward its outer wall.

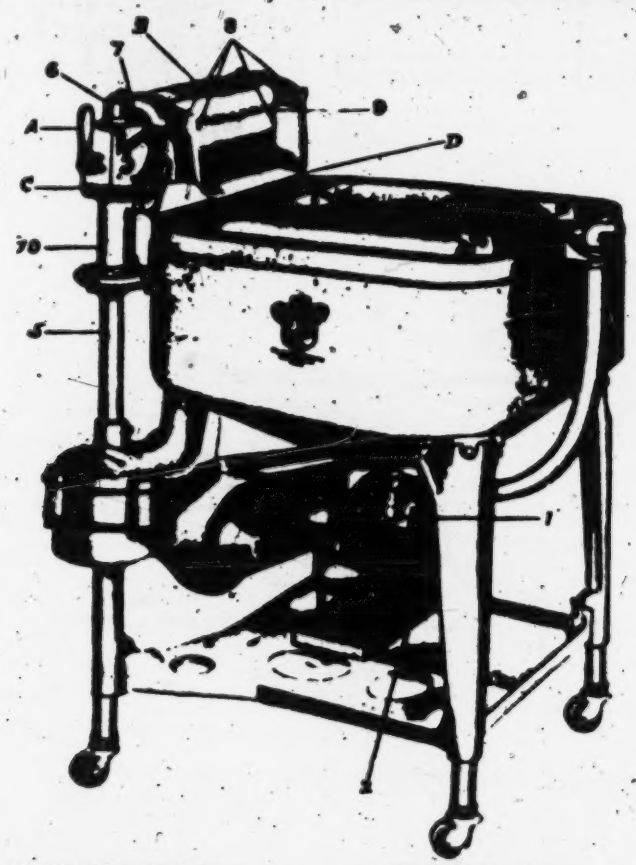
22. An agitator for washing machines, comprising an alternately rotatable body portion and a single asymmetrically disposed impelling portion extending substantially normally from said body portion.

GEORGE L. DAVIS.

DEFENDANT'S EXHIBIT 7

2455 PLAINTIFF'S EXHIBIT 95 1003

Directions for Operating Maytag Gyrafoam Washer



A—Wringer Control Lever
B Wringer Safety Release
C—Wringer Shifter Lever
D Operating Lever

Before putting water in the tub for washing, carefully oil the machine as shown by numerals on Illustration

Use automobile crank-case oil, except where other oil is specified

1—Hard oil pressure cup; give one-fourth turn before each washing. Be sure to engage the rack-bar before turning. Use vaseline.

2—End bearings on electric motor; two drops each washing.

5—For lower end of wringer drive shaft and crank thru pipe casing; three drops every washing.

6—Upper end of wringer drive shaft thru nickeled cap; two or three drops every second or third washing.

7—Wringer shaft bearing; one or two drops every second or third washing.

8—Roller bearings for wringer rolls, both ends. Release the wringer, turn upper roll back, and put one drop in the cavity of each ball-bearing, every second or third washing. Use sewing machine oil or Three-in-One oil.

9—Friction for drain board reverse, one drop sewing machine oil each washing

10—Wringer post; one drop every second or third washing.

Throw rack-bar out of gear and put a few drops of oil on top of the small roller.

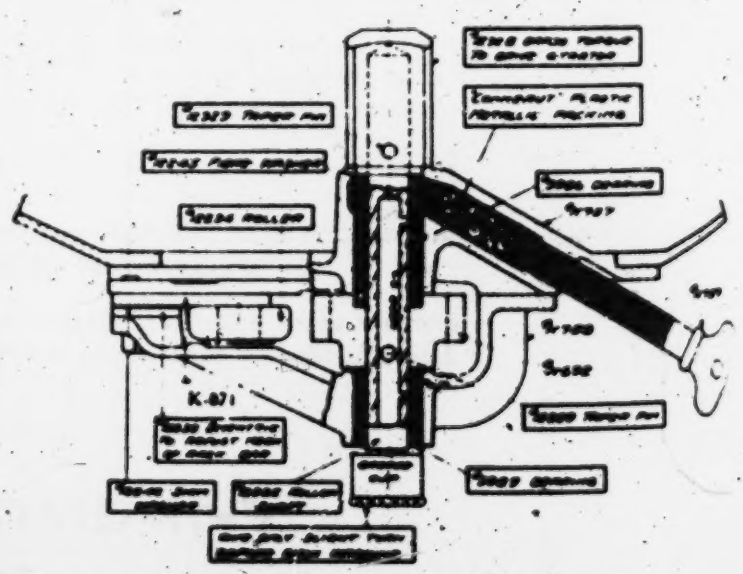
DIRECTIONS FOR OPERATING---Follow Carefully

FIRST—Remove gyratator from bottom of tub and see that drain hole is open.

SECOND—Oil the machine carefully.

THIRD—Fill the tub with hot water to within two or three inches of the top. Put in the soap and run the gyratator until the soap is thoroughly dissolved.

FOURTH—WITH THE GYRATATOR STILL RUNNING, put in clothes PIECE BY PIECE as long as the water rolls over them freely. Washing efficiency depends upon getting a free action of water over the clothes.



The Above is A Descriptive Cut of the Center Bottom

2 36

THE MAYTAG COMPANY

vs.

GENERAL ELECTRIC SUPPLY CORPORATION

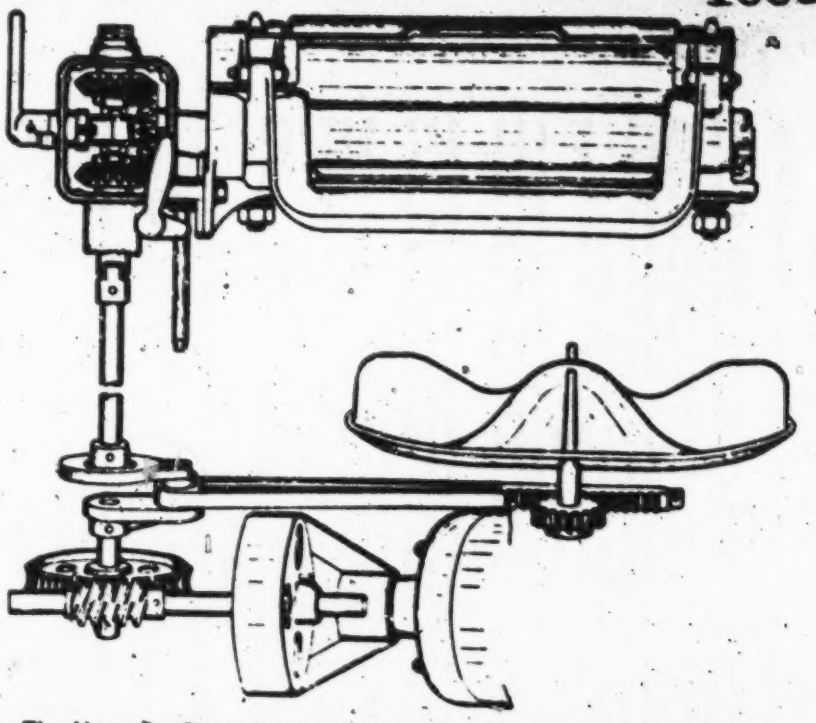
IN EQUITY 2352

DEFENDANTS EXHIBIT 7

Do not go by any directions as to just how many clothes to put in at a time. You, yourself, are the best judge as you can easily tell if there is a free action that will carry the clothes over and over. For instance, if eight sheets are to be washed, they may be washed quicker and more thoroughly by dividing them and washing four at a time.

Never wash lace curtains or cloth of fine texture with quilts or rugs or other heavy articles, but wash them separately or with light clothes. Two or three minutes will usually be long enough to clean them.

Be sure to use plenty of water and soap.



The Above Cut Shows Every Moving Part of the Maytag Gyrafoam Washer

Do not wash clothes longer than necessary to clean them, which you will find to be from two to eight minutes, depending upon how badly they are soiled.

Remember that every minute you run the machine longer than necessary, you are wasting that much time and electric current.

Do not put clothes in the tub first and pour water in on them, but put water in first, start the gyratator, then put in the clothes piece by piece. THIS IS IMPORTANT!

Do not drain the water out when there are clothes in tub.

The operator will not have time to wash the dishes or make the beds while the machine is cleaning the clothes. A little experience will surprise you how quickly the washing is done.

The Maytag Gyrafoam will clean more clothes in one hour than most other machines will do in two hours or longer.

When draining the tub, allow the machine to operate and when the soapy water has all run out, throw in a bucket full of clean water, let your machine run and you will be surprised to see how little wiping is necessary to clean the tub. Remove gyratator and wipe dry underneath it.

Unless you wish to observe the operation of the machine it is advisable to keep the lid of the machine closed to preserve the heat.

If, for any reason, you must stop the machine before the tubfull has been finished, be sure to throw the machine out of gear before starting the motor again.

If your tub should begin to leak around the gyratator shaft, turn the brass screw a little to the right. Be sure to turn the gyratator by hand to see that you do not lock the shaft.

Wishing you happiness and success with your new Gyrafoam Washer, we are

THE MAYTAG COMPANY

NEWTON, IOWA

2 37

Instruction Card for Maytag Washers

FOREWORD

1.—This card contains information necessary to the proper operation and care of your Maytag washer. Read it carefully, noting each explanation, which is necessary for economical and satisfactory operation.

2.—Your washer is a splendid piece of machinery and household equipment. If properly cared for it will give you years of satisfactory service at very little cost.

3.—Should you ever find it necessary to have adjustments made, we recommend having the work done by authorized Maytag dealers or service men. They are provided with equipment to render this service correctly. Furthermore, they are interested more than any other service shop in your personal satisfaction with your washer.

4.—Let only experienced service men make repairs or adjustments. Your washer is too valuable to place in unskilled hands. Expert workmanship is just as essential in servicing your washer as it is in building it.

IMPORTANT

1.—Should repairs be necessary it is important that you get genuine Maytag parts. This is assured when you have your Maytag washer serviced by an authorized Maytag dealer or service man.

2.—Imitation or counterfeit parts of inferior quality are being made and sold as Maytag parts or equals. Avoid their use by dealing with a Maytag dealer. You will then enjoy the satisfaction of knowing you have the same exceptional quality of material as used in the Maytag when manufactured.

3.—You will find your nearest Maytag dealer listed in the phone book.

WASHER NUMBER

1.—The washer number of the square tub aluminum washer is stamped on the side of the crown at the top when facing the washer. On the round aluminum tub, the washer number is on the leg, under the power unit. On the round vitreous enamel tub, the number is on the leg, under the power unit.

2.—If you have occasion to write the factory about your washer, it is advisable to mention the washer number.

DIRECTIONS FOR OPERATING MAYTAG WASHERS

1.—OILING: Oil washer carefully as follows: 1 or 2 drops occasionally on each end of upper roller and through hole in bearing at outer end of lower roll. Oil liberally through ball oiler in wringer gear case. Oil through ball oiler on top of wringer operating handle. Oil bearings at each end of motor every two or three months. Remove gyratator and oil the upper end of gyratator drive shaft, through slot.

2.—FILLING the tub with water, starting, and filling the tub with clothes: When filling the tub with water, be sure to observe the knurled waterline on the gyratator post, which is about two and one-half inches down from the top of the post. Do not fill the machine above this water line.

3.—To obtain the best results with this washer, we recommend soap or washing powder in the water. You, of course, know that strong washing powders or lye, used to excess, are injurious to the fabrics of all clothing.

4.—Always be sure to throw washer out of gear before starting motor.

5.—After you have filled the washer, you then start the motor, throw washer in gear, put in the soap and run gyratator until the soap is mixed thoroughly with the water. With the gyratator still running, put in the clothes, piece by piece, so long as the water rolls over them freely. Washing effectively depends upon getting free action of water over the clothes. For instance, if eight sheets are to be washed, they can be washed quicker and more thoroughly by dividing and washing four at a time.

(over)

6.—IMPORTANT: It is very important that you put the water in the machine first, then the clothes, piece by piece.

7.—Never wash lace curtains or cloth of fine texture with quilts or rugs, or other heavy articles, but wash them separately or with light clothes. Two or three minutes will usually be long enough to clean them. A little experience will surprise you how quickly the washing is done.

8.—Do not wash clothes longer than necessary to clean them, which you will find to be from two to eight minutes, depending upon how badly they are soiled. Remember that every minute you run the washer longer than necessary you are wasting that much time and electricity.

9.—We suggest leaving the lid on the washer closed when in operation, to retain the heat.

10.—Do not drain the water out when there are clothes in the tub. When draining the tub, allow the washer to operate and when the soapy water has all run out pour in a bucketful of clean water, let your washer run, and you will be surprised to see how little wiping is necessary to clean the tub. However, we do advise wiping the tub out thoroughly dry after draining. You should then remove the gyratator and wipe dry underneath it.

11.—IMPORTANT: If for any reason you must stop the washer before the tubful has been finished, be sure to throw the washer out of gear before starting the motor again.

12.—IMPORTANT: When washing is completed, wipe wringer dry and be sure to release tension on rolls, to avoid making rolls flat.

SUMMARY OF WASHER TROUBLES AND THEIR CAUSES

1.—If motor fails to start, remove and check electric attachment plug, and base of plug that is attached to the motor cord. Check motor cord to see that cord is not broken. Remove and check brush box, which is attached to the motor cord and motor. This box contains the brushes, and it is possible that one of these brushes, or possibly both, are badly worn. If this is the case one or both must be replaced. If the motor will not run after the above has been tried, we suggest you call a Maytag dealer or service man.

2.—If the belt becomes loose, this may be tightened by loosening the bolts at each end of the motor base, and pulling the motor toward you until the belt becomes tight. Be sure to tighten the two bolts that you have loosened after completing this operation.

3.—THE POWER UNIT: If in your opinion anything is wrong with this part, we suggest you immediately call a Maytag service man. Do not allow anyone but a Maytag service man to service your machine, if you want to continue having good results from your washer.

4.—THE TUB: If the water cools too quickly, you should be sure the lid is always down when the washer is in operation. (See Instruction No. 9.)

5.—WATER REMOVER: When throwing the wringer in or out of gear, be sure that the operating handle is moved completely around to position as indicated on the top of housing. If, in your opinion, anything is wrong with this unit, we suggest that you immediately call a Maytag dealer or service man.

6.—If the previous instructions are followed as outlined, we are certain you will enjoy owning and operating this exceptional achievement in washing machines.

Wishing you happiness and success with your new Maytag washer, we are

THE MAYTAG COMPANY, Newton, Iowa

2457
DEFENDANT'S EXHIBIT 7.
1007

1334 (Defendant's Exhibit 8, Letters Patent No. 1,572,759 to R. J. Anderson, February 9, 1926.)

1610

Feb. 9, 1926.

1,572,759

R. J. ANDERSON

CLOTHES WRINGER

Filed Jan. 8, 1923

4 Sheets-Sheet 1

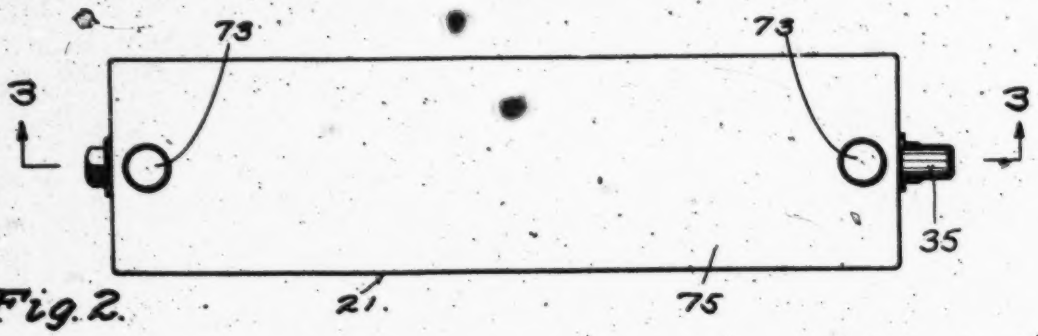


Fig. 2.

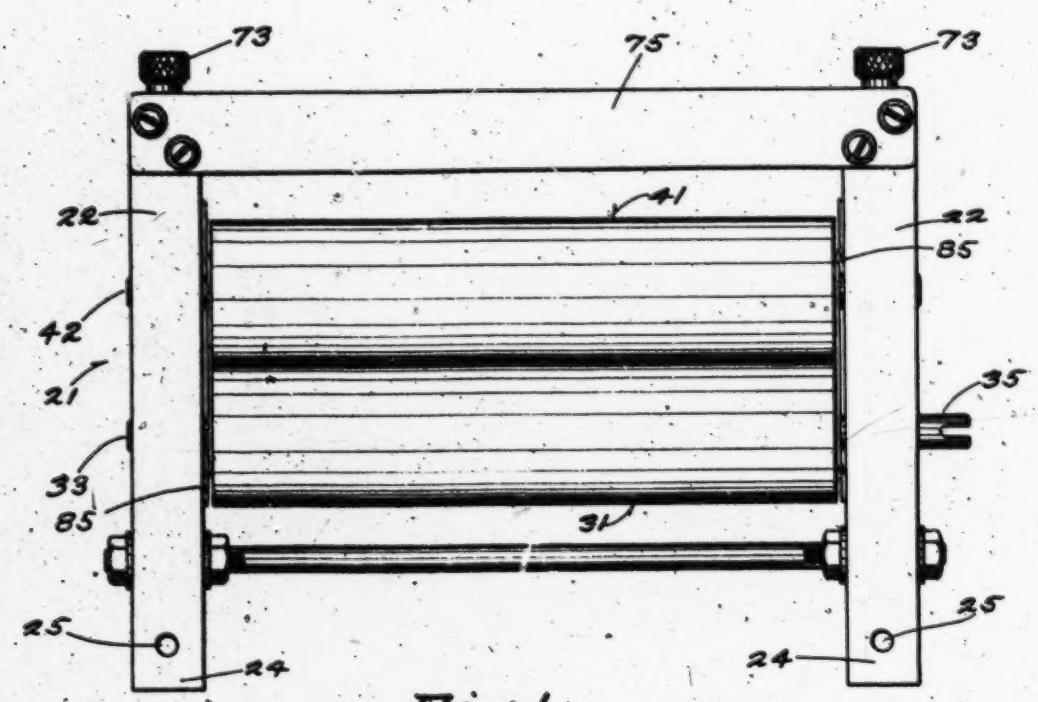


Fig. 1.

Inventor:
Robert J. Anderson,
by A. P. Verbeck
His Attorney.

1012 Feb. 9, 1926. 1,572,759

R. J. ANDERSON

CLOTHES WRINGER

Filed Jan. 8, 1923 4 Sheets-Sheet 2

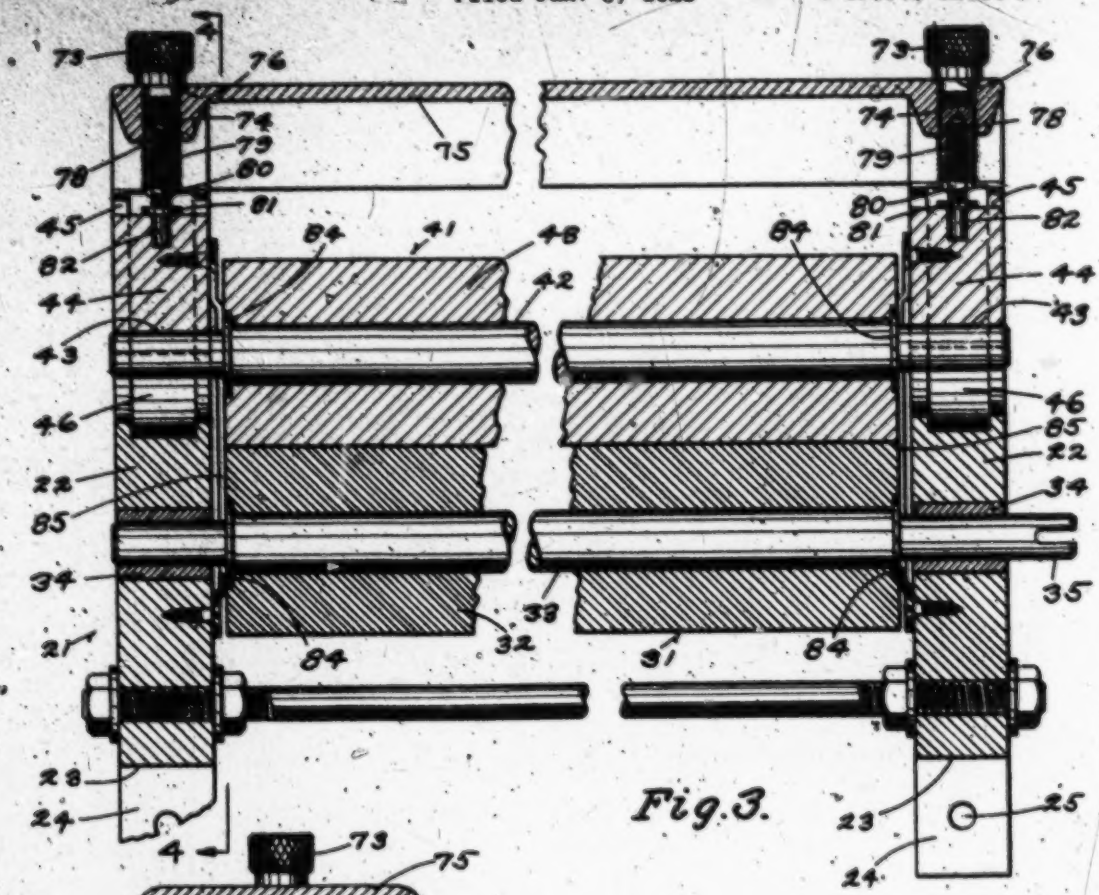


Fig. 3.

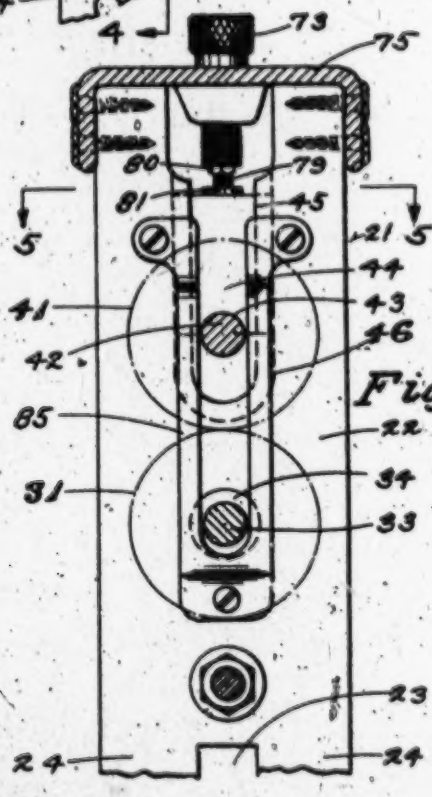


Fig. 4.

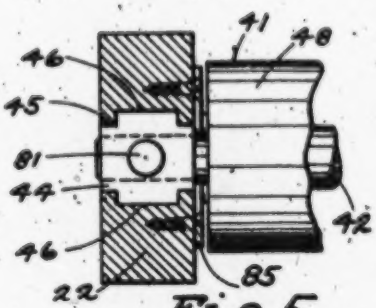


Fig. 5.

Inventor:
Robert J. Anderson,
by D. F. Hazlett
His Attorney.

1014 Feb. 9, 1926. 1,572,759

R. J. ANDERSON

CLOTHES WRINGER

Filed Jan. 8, 1923 4 Sheets-Sheet 3

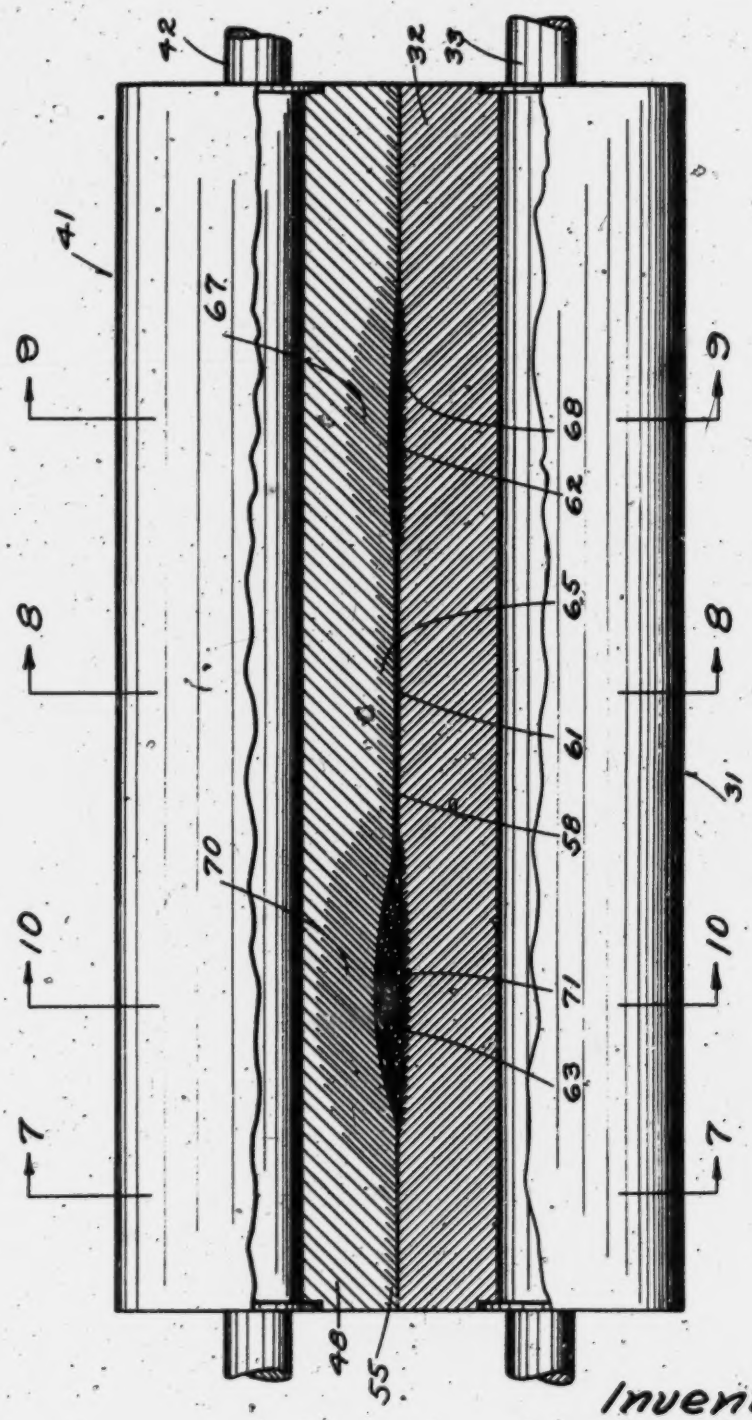


Fig. 6.

Inventor:
Robert J. Anderson,
by R. P. Barker
His Attorney.

1016 Feb. 9, 1926. 1,572,759

R. J. ANDERSON

CLOTHES WRINGER

Filed Jan. 8, 1923 4 Sheets-Sheet 4

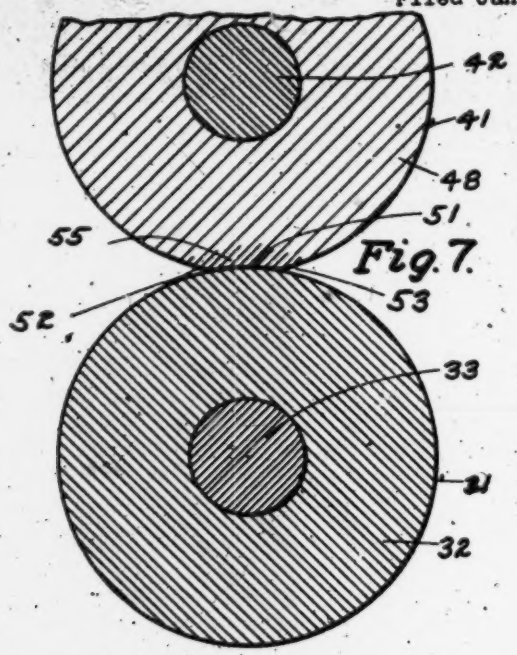


Fig. 7.

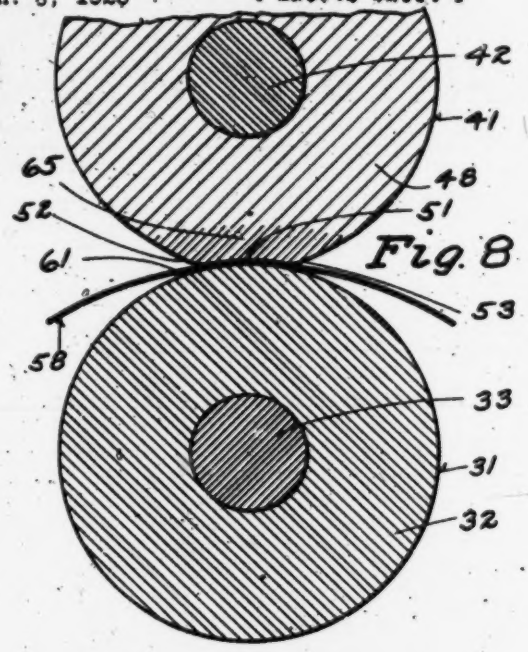


Fig. 8

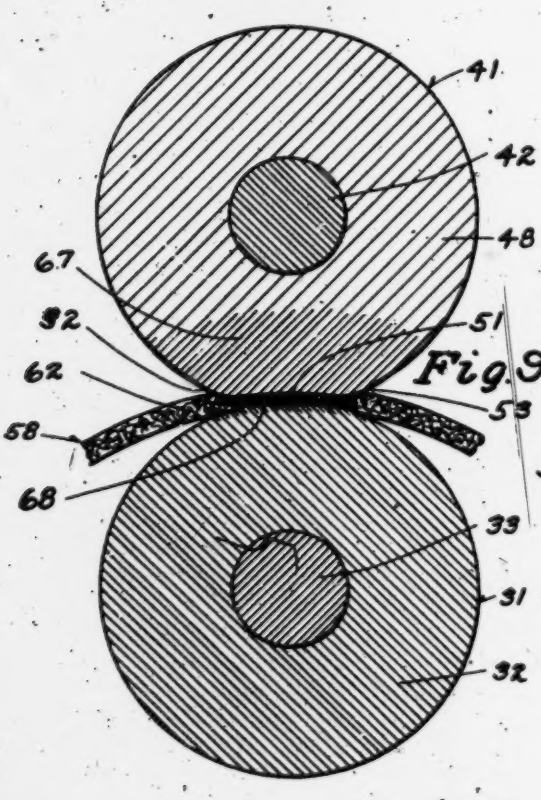


Fig. 9

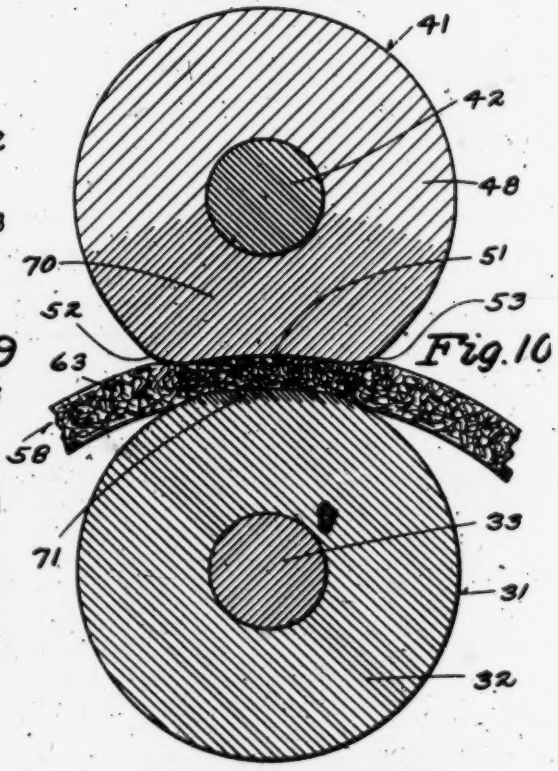


Fig. 10

Inventor:

Robert J. Anderson
by D. F. Hubbell
his Attorney

Patented Feb. 9, 1926.

1,572,759

1017

UNITED STATES PATENT OFFICE.

ROBERT J. ANDERSON, OF SIDNEY, OHIO.

CLOTHES WRINGER.

Application filed January 8, 1923. Serial No. 611,242.

To all whom it may concern:

Be it known that I, ROBERT J. ANDERSON, a citizen of the United States, residing at Sidney, in the county of Shelby and State of Ohio, have invented certain new and useful Improvements in Clothes Wringers, of which the following is a specification.

My present application is a continuation of a copending application heretofore filed by me in the United States Patent Office, January 20, 1922, as Serial No. 530,579, for clothes wringers, as to all matters common to the two applications.

My invention relates to wringers for wringing clothes for laundry purposes, and has for its object the provision of novel wringer rolls, and, further, means in association with such wringer rolls for determining the distance between their axes of rotation, for adjusting such distance, and for relieving pressure between the rolls while maintaining the adjustment for distance between said axes.

In carrying out my invention I provide coacting wringer rolls, one of which is a comparatively hard wringer roll and the other of which is a comparatively soft wringer roll. I have instanced the lower wringer roll as the comparatively hard wringer roll and the upper wringer roll as the comparatively soft wringer roll.

I further prefer to provide wringer rolls of comparatively large diameters. Instancing this latter feature, it may be stated as an example but not as a limitation, that it is the practice to have the wringer rolls usually employed in connection with power washing machines for home laundry purposes and for hand wringers one and three-quarters inches in diameter. I prefer to make my improved wringer rolls substantially two and three-quarters inches in diameter, thereby providing a body of greater thickness, especially for the comparatively soft wringer roll, permitting yield throughout a substantial great thickness of comparatively soft resilient body, resisted by a comparatively hard body in the wringing operation, in order to permit the comparatively soft wringer roll to conform to the cross-sectional shape of the goods passing between the rolls at all points throughout the length of the rolls in order to express the fluid from the goods regardless of differences in thickness of the same, and minimizing the danger and the detrimental effect of having the operator seized between the wringer rolls.

A further object of my invention is to provide a clothes wringer capable of successful operation without the employment of gearing between the ringer rolls. It has been found necessary in present usual practice to provide driving gearing between the two rolls of a wringer to cause the rolls to grip the goods presented therebetween in order to cause entrance of the goods between the wringer rolls. In such present usual construction and arrangement of wringer rolls it is necessary to employ gearing to cause the wringer rolls to bite upon the goods to cause entrance thereof between the wringer rolls, as without such driving gearing the driven wringer roll merely turns idly upon the goods and the wringer rolls fail to exert sufficient surface traction upon the goods to feed the same in between the rolls.

A further object of my invention is to provide the resiliency desired between the rolls in the comparatively soft wringer roll itself; further, to provide a comparatively hard wringer roll which is resilient and is arranged to yield to pressure of the goods passing between the rolls to substantially less extent than the yield to pressure of the comparatively soft wringer roll, and a further object is to dispense with the necessity for springs and other resilient pressure means acting upon the shafts of the rolls.

It is the object of my invention, further, to provide novel wringer rolls and arrangement of wringer rolls whereby said wringer rolls are self-cleaning; and the invention will be further readily understood from the following description and claims, and from the drawings, in which latter:

Fig. 1 is a front elevation of a wringer embodying my invention.

Fig. 2 is a plan view of the same.

Fig. 3 is a longitudinal vertical section of the same, taken on the line 3—3 of Fig.

2, with the middle portion of the wringer broken away.

Fig. 4 is a vertical cross-section of one end of the clothes wringer taken in the plane of the line 4—4 of Fig. 3.

Fig. 5 is a horizontal cross-section of a detail of the same, taken on the line 5—5 of Fig. 4.

Fig. 6 is a diagrammatic longitudinal section of the opposed wringer rolls, showing the comparatively soft wringer roll contacting the comparatively hard wringer roll at its end in driving relation, and a heavy bunching of goods, a light bunching of goods, and a normal stretch of goods between the wringer rolls, to show the compressive effects of these various conditions, especially upon the soft wringer roll.

Fig. 7 is a diagrammatic vertical cross-section, taken in the plane of the line 7—7 of Fig. 6, and showing the wringer rolls in normal contact relation, with the lower portion of the soft wringer roll compressed and displaced by the hard wringer roll under normal pressure for driving relation.

Fig. 8 is a diagrammatic cross-section, taken in the plane of the line 8—8 of Fig. 6, showing the compressive and displacement action on the soft wringer roll caused by the pressure of a normal stretch of goods between the wringer rolls.

Fig. 9 is a diagrammatic cross-section, taken in the plane of the line 9—9 of Fig. 6, showing the relatively material compressive and displacement action instanced on the comparatively soft wringer roll and materially less compressive and displacement action instanced on the comparatively hard wringer roll caused by the pressure of a light bunching of goods; and

Fig. 10 is a diagrammatic cross-sectional view, taken in the plane of the line 10—10 of Fig. 6, showing the relatively material compressive and displacement relation instanced as caused upon the comparatively soft wringer roll and the materially less compressive and displacement relation instanced as caused upon the comparatively hard wringer roll by a heavy bunching of goods between the wringer rolls.

I do not herein claim the specific means for adjusting the distance between the wringer rolls or the pressure between the wringer rolls, or for relieving and renewing contact or pressure between the wringer rolls, herein shown and described, having shown, described and claimed the same in my aforesaid application, Serial No. 530,579.

The frame of the wringer is exemplified at 21, the lower ends of the end posts 22 of which are provided with slots 23 to form legs 24 arranged to be suitably secured for instance to the usual wringer-bar of a washing machine when the wringer is used on a power washer, or to a suitable tub when used as a manual wringer, the bar or the rim of the tub being received in the slots and suitable securing means therefor being received through holes 25 in the legs of the end frames.

A lower roll 31 comprises a body 32, which is of comparatively hard substance, for instance, of comparatively hard resilient rubber, such as is now usually employed in wringer rolls, having a large amount of hardening substance, for instance, chalk, clay or other earthy substance, in its composition, for making the same substantially resistant to indentation by pressure of the goods passing between the rolls, though not wholly so. This body is shown fixed on a shaft 33 journaled in bearings 34, and has attaching means 35 at its end by means of which to connect the shaft with the power shaft of a washing machine, or with a crank-handle when used as a manually operated wringer. This roll is exemplified as the driving roll of the clothes wringer.

A comparatively soft wringer roll 41 is provided to oppose the comparatively hard wringer roll. The roll 41 is shown provided with a shaft 42, and is shown held toward the comparatively hard wringer roll by means of bearings 43, in bearing blocks 44. The bearing blocks are arranged to slide in guides 45 of the end frames, having guideways 46, preferably arranged to prevent undue turning of said bearings in their guides, and for locating the bearings 43 thereof in parallelism with the shaft of the upper wringer roll.

The bearings 34 of the lower roll shaft are shown as bushings inserted in the intermediate solid portions of the respective end frames. These bushings and the upper bearings are preferably anti-friction bearings, the lower bearings being preferably so-called Arbuta bearings, and the upper bearings being of wood impregnated with a fatty substance, for instance, tallow.

Suitable means are provided for preferably unyieldingly holding the bearings of the upper roll and lower roll at definite distances apart for causing any yield there may be during ordinary operation between the rolls to take place within the rolls, and more especially in one of the rolls, namely, the soft wringer roll, which is substantially more yieldable than the comparatively hard wringer roll coacting therewith.

This comparatively soft wringer roll comprises a body 48, which is preferably a substantially pure, soft vulcanized rubber, forming a comparatively soft resilient yielding body, with relation to the comparatively hard body of the comparatively hard wringer roll. This comparatively soft wringer roll is also of substantially greater diameter than wringer rolls of this character

heretofore employed, for providing a resiliently yielding body of substantial depth to receive and resist the goods passing between the rolls in such manner that pressure is exerted upon the goods throughout the length of the roll, regardless of different thicknesses of goods which may simultaneously pass between the rolls along their lengths, in order to simultaneously express the fluid from goods of different thicknesses between the rolls. The wringer rolls are instanced as of equal diameters.

I have shown the manner of coaction between the comparatively soft wringer roll and the comparatively hard wringer roll and the goods of different thicknesses therebetween diagrammatically by the section lining in Figs. 6 to 10 inclusive.

The bearings for the wringer rolls are normally so placed that the outer periphery or cylinder of the hard wringer roll normally slightly enters the normal outer peripheral or cylindrical projection of the soft wringer roll along the contact line between the wringer rolls, to form a contacting strip 51 between the wringer rolls, the soft wringer roll being thereby formed with bulges 52, 53, along the wringer roll at the respective sides of said contacting strip. The pressure effect or compressive action upon the soft wringer roll and its extent is indicated by the closer section lining 55.

This indentation of the soft wringer roll by the hard wringer roll forms a driving connection between the wringer rolls, the hard wringer roll being instanced as the driving wringer roll, and the soft wringer roll as the driven wringer roll, this indentation of the soft wringer roll by the hard wringer roll preferably forming the sole driving connection between the wringer rolls.

Upon goods 58 being passed between the wringer rolls, the indentation of the soft wringer roll is increased locally at the goods, thereby resiliently yielding to the increased pressure of the goods resisted by increased pressure of the body of the soft wringer roll, dependent on the thickness of the goods.

This yielding is local merely, so that goods of different thicknesses, as at 61, 62 and 63, may be passed side by side between the wringer rolls, the soft wringer roll yielding locally or in spots to the bunchings of various thicknesses, and the yielding taking place in the soft wringer roll or in both wringer rolls, dependent on the thickness, so that all portions of the goods simultaneously passing between the wringer rolls receive pressure for expressing the fluid therefrom, at the same time maintaining driving connection between the wringer rolls or between the wringer rolls and the goods therebetween. The normal thickness of goods at 61 (see Fig. 8), is exemplified as causing yield only in the soft wringer roll, as indicated by the section lining 65 of greater extent.

If undue pressure is exerted by thicknesses of goods between the wringer rolls, the relatively hard resilient wringer roll will also yield to the pressure, but preferably to materially less extent than the yield of the soft wringer roll at the points of such excess pressures. Such undue pressures to different degrees and their relative effects upon the respective wringer rolls are exemplified at the points in the lengths of the wringer rolls where the bunchings 62 and 63 of the goods are shown in Fig. 6, and in Figs. 9 and 10. The pressure effect and compressive action for a bunching of goods, such as shown at 62, is illustrated in Fig. 9 by the still greater extent of closer section lining 67 in the comparatively soft wringer roll and the closer section lining 68 of materially less extent in the comparatively hard wringer roll. The pressure effect and compressive action for a bunching of goods, such as shown at 63, is illustrated in Fig. 10 by the more extended closer section lining 70 in the comparatively soft wringer roll and the closer section lining 71 in the comparatively hard wringer roll, the closer section lining 71 being of greater extent than that shown in the comparatively hard wringer roll in Fig. 9, but of materially less extent than that shown in the comparatively soft wringer roll shown in Fig. 10. These examples are given as illustrations, but are not to be construed as limitations.

The resilient yieldings in the respective wringer rolls take place in the yielding resilient materials of which their bodies are composed, preferably to materially greater extent in the softer resilient material of the softer wringer roll than in the harder resilient material of the harder wringer roll, depending on the thicknesses of the various portions of the goods between the wringer rolls. The yieldings in the materials of the rolls preferably take place radially of the rolls, the yieldings being preferably in the yielding resilient materials of the body of the wringer rolls toward their respective shafts.

The indentation of the hard wringer roll into the soft wringer roll and the bulges in the soft wringer roll at the sides of the band of contact between the wringer rolls, progresses about the periphery of the wringer rolls as the wringer rolls are rotated, forming traction between the wringer rolls for rotating one wringer roll by means of the other, and thereby dispensing with gearing between the wringer rolls, and acting upon the peripheral surfaces of the wringer rolls to knead and clean the same, whereby the peripheral surfaces of the

wringer rolls are kept free from the soapy, oily and slimy conditions prevalent with wringer rolls as heretofore usually employed. This coaction between the rolls also resists the tendency to form flat spots on the peripheries of the wringer rolls, and to remove any flat spots that may be formed, as the rolls are being continually kneaded during operation to cause the materials in the rolls to resume their original shape.

The soft wringer roll in my improved arrangement of wringer rolls further yields to buttons, buckles and other hard substances that may pass between the wringer rolls, thereby minimizing the tearing of buttons, buckles and the like from the goods in the act of wringing, and further minimizing the danger of injury to the user in case a finger and the hand should be caught between the wringer rolls.

My improved construction is such, further, that the employment of springs or similar tension devices acting upon the wringer rolls may be dispensed with, and I prefer to fixedly position the bearings of the upper wringer roll with relation to the bearings of the lower wringer roll, but desirably provide means whereby adjustment may be obtained between the wringer rolls for adjusting the pressure therebetween, and whereby relief of such pressure is obtained, for instance, when the washing is done or the wringer is not to be used for a time, and whereby repositioning of the wringer rolls into operative relations may be obtained without disturbance of adjustments for distance relations between the axes of rotation of the upper and lower wringer rolls.

The means for positioning the upper bearings are shown as a pair of positioning screws 73, received in threaded holes 74, shown located in the top bar 75 of the wringer frame. The positioning screws are provided with shoulders 76, arranged to bear upon the upper ends of the walls of the threaded holes for determining the limit of movement of the positioning screws toward the bearings, and having knurled heads to readily turn the same. If desired, the positioning screws may be unscrewed for relief of pressure between the rolls, as when the wringer is out of use, the shoulders however determining the normal positional relations between the bearings when the wringer is again placed in normal use.

If adjustment for the upper bearings, that is, adjustment of normal distance between the axes of rotation of the wringer rolls, is desired, I prefer to provide an adjusting means between said positioning screws and said bearings. This is accomplished in the present instance by providing the inner ends of the positioning screws with threaded bores 78, in which abutment screws 79, are adjustably received, jam-nuts 80 clamping the abutment screws in adjusted positions. The abutment screws are arranged to coact with contact heads 81, having shanks 82, received and held in holes in the respective upper bearings.

The ends of the respective rolls are provided with washers 84 which coact with end plates 85 secured to the posts 22 to position the wringer rolls endwise.

My improved device forms exceptionally efficient means for expressing the fluids from the goods, especially where the goods are passed between the wringer rolls in uneven thicknesses lengthwise of the wringer rolls; provides ready means whereby the pressures between the wringer rolls may be readily temporarily relieved for accommodating undue thicknesses of goods, as by temporary adjustment of the positioning screws 61, while maintaining the adjustments for usual thickness of goods passing between the wringer rolls; provides ready means whereby the comparatively hard wringer roll and comparatively soft wringer roll are positioned at distance relations, for effective wringing of the goods; provides ready means whereby the comparatively soft resilient wringer roll of itself or in conjunction with the comparatively hard resilient wringer roll conforms to the cross-sectional shapes of the goods passing between the rolls at all points throughout the length of the rolls, whereby the injurious effect of having the finger or hand of the operator seized between the wringer rolls is minimized or obviated, and whereby the employment of gearing or other extra driving means between the rolls is avoided; and provides self-cleaning properties for the wringer rolls.

Having thus fully described my invention, what I claim as new, and desire to secure by Letters Patent, is:

1. In a clothes wringer of the character described, the combination of a comparatively hard resilient wringer roll, a comparatively soft resilient wringer roll, each of said wringer rolls being solid and of substantially equal resilience throughout its body, a central rigid shaft in the body of said comparatively soft resilient wringer roll, and pressure means exerting pressure on said shaft at the ends of said last-named roll, and said wringer rolls being substantially coextensive in length.

2. In a clothes wringer of the character described, the combination of a comparatively hard resilient wringer roll, a comparatively soft resilient wringer roll, each of said wringer rolls being solid and of substantialy equal resilience throughout its body, said wringer rolls being substantially coextensive in length, a rigid shaft cen-

trally located in each of said wringer rolls, means exerting pressure on said shaft in said comparatively soft resilient wringer roll at the ends of said last-named roll, and means driving said shaft of said comparatively hard resilient wringer roll, and said comparatively soft resilient wringer roll located in tractive relation with said comparatively hard resilient wringer roll to form the sole driving connection between said wringer rolls.

In testimony whereof, I have hereunto signed my name.

ROBERT J. ANDERSON.

1344 (Defendant's Exhibit 9, Letters Patent No. 1,789,087 to H. F. Snyder, January 13, 1931.)

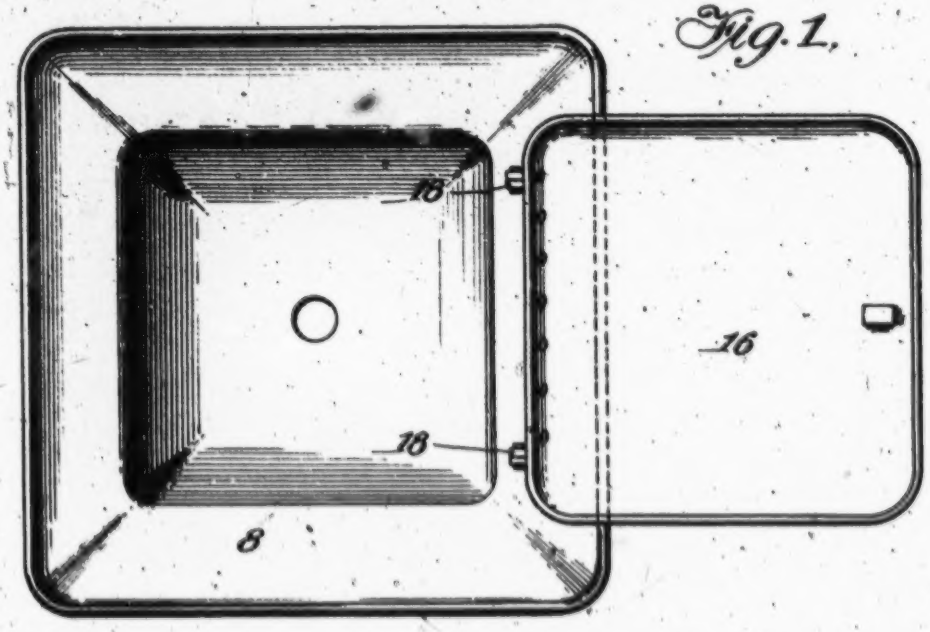
Jan. 13, 1931. H. F. SNYDER 1,789,087

1024

WASHING MACHINE

Filed July 2, 1927

Fig. 1.



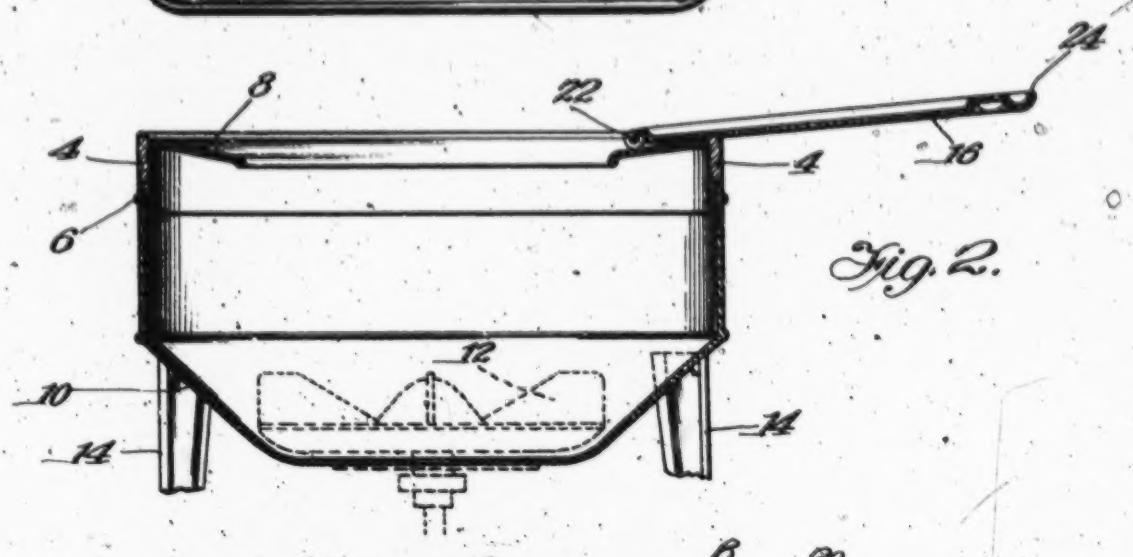


Fig. 2.

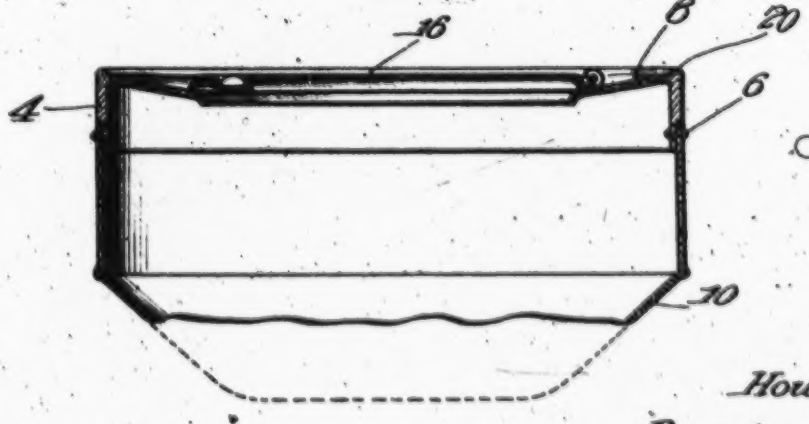


Fig. 3.

Inventor:
Howard F. Snyder.
By Wallace R. Lane
Attys.

UNITED STATES PATENT OFFICE

HOWARD F. SNYDER, OF NEWTON, IOWA, ASSIGNOR TO THE MAYTAG COMPANY, OF NEWTON, IOWA, A CORPORATION OF DELAWARE

WASHING MACHINE

Application filed July 2, 1927. Serial No. 203,215.

This invention relates to tubs for power driven washing machines and more particularly to the construction of the top portion of the tub and to its cover which normally closes the opening in the top of the tub through which the clothes are inserted.

The present application is a continuation in part of my pending application 568,158 filed by me on June 14, 1922.

The objects of my present invention are to provide a tub of the above described character which is composed of a strong but light, thin gauge metal, cast or otherwise formed so that the tub walls are substantially without seam or joint and which body is provided with an upper reinforcing rim that not only makes a neat joint with the main body of the tub but is formed with preferably integral inwardly projecting flanges inclining downwardly and inwardly so as not only to drain the water back into the opening of the tub but also to provide a downwardly inclined wall on which the cover may be hingedly mounted and upon which it may seat so as to lie in substantially the top plane of the tub and form a substantially table-like top for the tub; to provide a substantially flat and dished cover and to pivotally mount it on the inwardly, downwardly inclined flange of the tub so as to lie flat when in closed position and thereby to form a substantially flat table-like top for the tub upon which articles may be placed, or when in open position to project outwardly from the tub to form a relatively large clothes retaining dish or basket which is supported by the rim of the tub and which dished cover is preferably slightly inclined downwardly at its hinged portion toward the tub opening, so that the water from the soaked fabrics which accumulates in the dished cover may drain backwardly over the downwardly, inwardly inclined flange into the tub.

The above and other features of novelty, advantages and capabilities will become apparent from a detailed description of the accompanying drawing, in which I have illustrated one form of my invention.

Fig. 1 is a plan view of my tub with the cover in open position.

Fig. 2 is a side view thereof, and

Fig. 3 is a view similar to Fig. 2 with the cover closed.

In general my tub is formed of relatively thin gauge material, preferably metal, so as to provide a light but strong and sturdy body. In the present instance I prefer to form the tub body proper of cast aluminum.

The walls of the tub are preferably vertical at their upper portions and are reinforced by a shouldered rim 4 of thicker proportions. The tub walls and exterior rim walls are flush and are fastened by rivets 6. This rim is formed with preferably integral inwardly and downwardly extending flanges 8 which terminate at their inner portions to form a clothes opening for the tub. In the present instance my tub is substantially square with rounded corners, and the clothes opening is of similar shape. The bottom of the tub has its walls 10 sloping inwardly to a central substantially flat portion in which is rotatably mounted the power driven liquid impeller 12. In addition the tub is provided with suitable legs 14 which support it at a suitable elevation from the floor.

The tub is provided with a cover 16 adapted to close the open top of the tub and this cover is adapted to swing to substantially level open position to provide a shelf or clothes receptacle. In the present embodiment I provide one of the inwardly and downwardly inclined flanges 8 with two slightly upstanding lugs 18 spaced apart and located at points somewhat removed from the upstanding ridge 20 of the rim 4 and relatively near the clothes opening. These lugs are bored and the cover 16 is pivotally or hingedly mounted thereto, the pivot point 22 preferably lying somewhat below the level of the uppermost plane of the tub. This is made facile because of the inclined flange 8 on which the cover is mounted. The cover is quite flat in general form so that when it is in closed position as in Fig. 3 it will lie substantially flat with the top of the tub and form a substantially table-like top for the tub. In addition when the cover is

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swung to open position it projects out almost level, or exactly level if desired, to form a shelf or clothes receiving plate or receptacle.

In the present instance I prefer to slightly dish the cover, providing it with rather curled edges 24 which fit closely the inclined flanges 8 to make a good water tight-fit. Thus by dishing the cover 16 I form a receptacle in which the water soaked clothes or fabrics may be deposited as they are taken from the tub and the excess water will be held in the dished cover. In the present instance I prefer to give the cover a slight inclination from the horizontal and in a direction toward the tub opening, so that this excess of water from the clothes held therein will tend to drain back over the inclined flange 8 and into the tub. Manifestly, if desired, the curled edge of the cover at this point may be formed to facilitate the draining of the water back into the tub, as by providing it with suitable drain apertures.

An important feature of my cover construction lies in the fact that the cover when in open position as shown in Fig. 2 is braced by the upstanding ridge of the rim.

It will be apparent that this improved construction is inherently advantageous since the cover not only provides a flat-topped tub on which various articles may be rested, but also provides an additional shelf or clothes receptacle when the cover is in open position. And when in such open position the tub itself is arranged firmly to brace the cover, and the flange on which the cover is hinged forms a drain flange to direct the excess water contained within the dished lid back into the tub opening.

Having thus described my invention, I claim:—

1. In a washing machine, a tub body of approximately rectangular shape in horizontal section provided with vertical side walls, each of which is provided with inwardly and downwardly inclined flanges, said flanges being of approximately the same width, the free edges of said flanges cooperating to provide a clothes-inserting opening, the top edges of the side walls projecting above the plane of the flanges so as to provide a peripheral ridge, spaced apart lugs extending upwardly from one of said flanges, and a cover hinged to said lugs.

2. In a washing machine, a tub body of approximately rectangular shape in horizontal section provided with vertical side walls, a reenforcing rim secured to the top edges of said side walls and forming vertical extensions thereof, each of the walls of said rim being provided with an inwardly and downwardly inclined flange, said flanges being of approximately the same width and having their free edges positioned to provide a clothes-inserting opening, the top edges of said rim projecting above the plane of the flanges so as to provide a peripheral ridge, spaced apart lugs extending upwardly from one of said flanges, and a cover hinged to said lugs.

3. In a washing machine, a tub body of approximately rectangular shape in horizontal section provided with vertical side walls each of which has an inwardly and downwardly inclined flange, said flanges being connected with each other and of approximately the same width, the free edges of the flanges cooperating to provide a clothes-inserting opening, spaced apart lugs projecting upwardly from one of said flanges, a dished cover provided with curved edge flanges, the bottom edges of which rest upon the first mentioned flanges while the tub is in closed position, and hinge means connecting one of said curved edges with said lugs.

In witness whereof, I hereunto subscribe my name to this specification.

HOWARD F. SNYDER.

1348 (Defendant's Exhibit 10, Letters Patent No. 1,793,522 to H. F. Snyder, February 24, 1931.)

Feb. 24, 1931. H. F. SNYDER 1,793,522

1028

WASHING MACHINE TUB.

Filed July 11, 1927

Fig. 1.

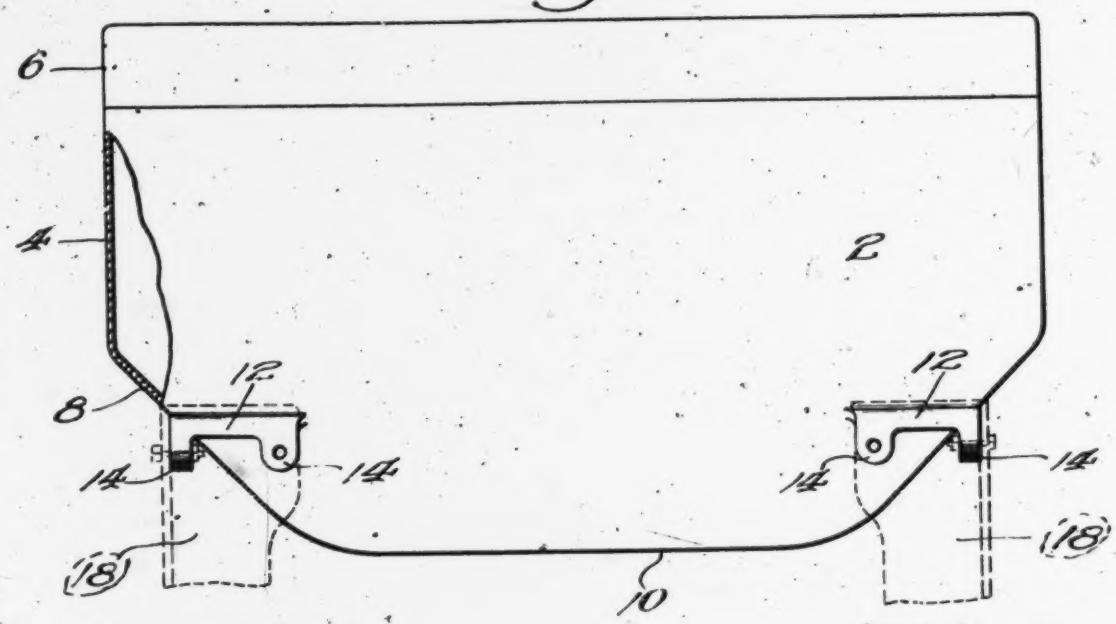


Fig. 2.

Fig. 3.

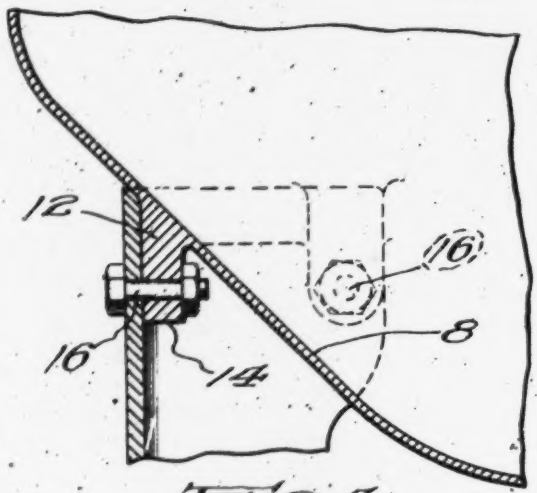
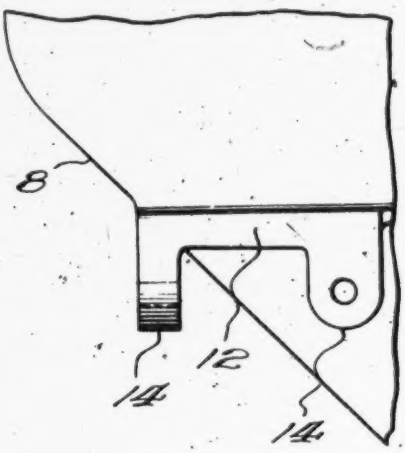
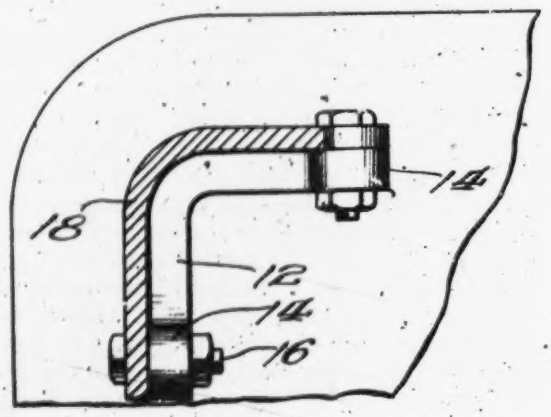


Fig. 4.





Inventor:
Howard F. Snyder,
By Wallace R. Lane
Atty's

UNITED STATES PATENT OFFICE

HOWARD F. SNYDER, OF NEWTON, IOWA, ASSIGNOR TO THE MAYTAG COMPANY, OF NEWTON, IOWA, A CORPORATION OF DELAWARE

WASHING-MACHINE TUB

Application filed July 11, 1927. Serial No. 204,967.

This invention relates to tubs for power driven washing machines and more particularly to details of construction of means for supporting the tub on its legs.

The present invention is primarily designed for application to the washing machine tub disclosed in my pending application Serial Number 568,158, filed June 16, 1921, and also in Letters Patent No. 1,644,956 issued October 11, 1927 although not limited thereto.

One of the objects of my invention resides in providing a tub of relatively light gauge material having side walls with vertical upper portions and lower inwardly inclined portions which merge into the bottom of the tub and in attaching the supporting legs to the inwardly inclined walls and at points inside the planes of the vertical walls of the tub, whereby the downward thrust of the tub, especially when in operation, is supported on these inwardly inclined surfaces, as distinguished from vertical wall surfaces.

Another object resides in forming the tub of relatively light gauge material, preferably metal, which material has integrally formed leg attaching means on its bottom or side walls to which the supporting legs of the tub may be attached without perforating the wall of the tub.

Another object resides in providing a cast metal tub, and preferably cast aluminum tub, of relatively light gauge metal and wherein the basal wall portions are so constructed and arranged so that the supporting legs may be easily and securely bolted or otherwise fastened thereto.

These and other objects of my invention will be apparent from a perusal of the following specification when taken in connection with the accompanying drawing, wherein

Fig. 1 is an elevational side view of my tub with a certain portion thereof broken away.

Fig. 2 is an enlarged sectional view of a corner of the tub.

Fig. 3 is an enlarged fragmentary elevation of the lower left portion of the tub shown in Fig. 1, and

Fig. 4 is a bottom sectional view of the leg fastening lugs.

Referring to the drawings in detail, my improved tub is of the general construction shown in both of my co-pending applications above identified and includes a preferably substantially square tub 2 of relatively light gauge material, preferably metal, and having rounded corners. In the present embodiment I have described my tub as made of aluminum or aluminum alloy and preferably cast. In this manner a very light, sturdy tub is provided and the tub itself will have all of the advantages and virtues set forth in said co-pending application Serial No. 568,158, which claims the particulars or details of the tub itself. The present application is directed to the leg supporting construction of the tub and those features of the tub construction which cooperate with the leg supports.

The side walls 4 of the tub are preferably vertical and at their upper ends are provided with a reinforced rim 6. The lower portions 8 of the tub walls incline inwardly and downwardly and thence extend substantially horizontally as described and claimed in said application, Serial No. 568,158, to form the bottom part 10 of the tub. In the preferred construction the liquid impeller, not shown, is arranged to project upwardly through the horizontal portion of the tub bottom, as fully disclosed in both of the previously filed applications above identified.

In the embodiment selected to illustrate the invention the basal portions of the tub walls have integrally formed leg attaching means whereby the supporting legs may be attached directly to these leg attaching means without perforating the tub walls. And another important feature of my invention resides in locating the leg attaching means on the inwardly and downwardly inclined wall surfaces 8, so that the tub is supported at four corners on surfaces which incline inwardly and downwardly toward the central axis of the tub. This provides a very sturdy and balanced support for the tub and eliminates the presence of the usual shearing action of the weight of the tub, if the tub be

supported by legs which are attached at the vertical side walls, as in other constructions. In addition my construction eliminates the necessity of providing an especial supporting frame or support for the tub to rest upon. By mounting the legs on the inclined surfaces the supports are brought inside the planes of the vertically extending exterior walls of the tub, so that the downward thrust of the tub load is more centralized and a more compact structure is provided.

In the illustrative embodiment, the inclined wall portions 8 at each of the four corners of the tub are provided with integrally formed depending lugs. Any desired leg attaching means may be availed of, but in the present instance I prefer to provide lugs 12 of approximately right angular shape in plan view, and of the general cross section shown in Fig. 4 of the drawing, wherein by placing the lugs at each corner, each leg of the L-shaped lug will be parallel with the adjacent side of the tub at the corner and the apex of the lug will be slightly curved to conform to the curved corner of the tub. In addition the extreme ends of each lug are provided with rounded enlargements 14, which are perforated to receive fastening bolts 16, or the like. The supporting legs 18 are likewise of approximately right angular shape in cross section at their upper ends and are shaped exactly to fit the outer or exterior walls or faces of these attaching lugs. By locating the legs on outer sides of the lugs and securing them together at the two points indicated in Fig. 4, a most sturdy and balanced construction is provided, since the weight of the tub being supported on the four inclined surfaces is more concentrated toward the center of the leg supports, which is the central axis of the tub. These legs are rigidly bound together not only at their points of attachment to the lugs but also at their basal portions, as shown in my pending applications above identified.

In addition by placing the leg attaching means on the inclined surfaces, the downwardly extending legs are brought directly under the tub and inside the planes of the vertical side walls, so that there is a more pronounced inward and downward thrust of the tub load, and a more compact arrangement is secured, since the tub legs do not project beyond the lateral walls of the tub, but are well within them. It will also be noted that the upper extremities of the legs abut against the sloping bottom of the tub.

By the above described construction it will be apparent that I have eliminated the necessity of forming holes in the basal walls of the tub for attaching the supporting legs of the tub and this is most important because, under the constant vibrations of the impeller, great strain is placed on the supporting legs. In constructions where the legs are bolted directly to the walls of the tub by bolts or rivets passing through perforations in the walls, these tend to work loose and permit leakage of the water. In addition by placing the legs at the points indicated, I have eliminated the necessity of supporting the tub from its vertical walls, which construction has a tendency to produce a shearing effect on the leg fastening means when supported by a vertical wall.

Having shown and described my invention, I claim:

1. In a washing machine, a tub constructed of relatively thin metal, said tub having a basal portion of approximately rectangular form in horizontal section, the walls of said basal portion inclining inwardly and downwardly, integral leg attaching lugs of approximately right angular form in plan view extending downwardly from the basal portions at positions coinciding with the corners formed by the walls of said basal portion, and legs secured to said lugs, the lugs being spaced inwardly from the vertical walls of the tub a substantial distance so that the legs are well inside of the planes of said side walls, and the downward thrust of the tub is upon the said inclined basal portions.

2. In a washing machine, a tub constructed of thin metal and provided with side walls extending vertically for a portion of their extent and inclined inwardly and downwardly for the remainder thereof, leg attaching lugs on the inwardly and downwardly extended portions and each spaced a substantial distance inwardly of the vertical portion of the side walls, so that the downward thrust of the tub is on the inclined wall portion, and legs connected with said lugs.

3. In a washing machine, a tub constructed a relatively thin metal having an inwardly inclined basal portion of approximately rectangular form in horizontal cross section, leg attaching lugs extending downwardly from the basal portion at positions coinciding with the corners formed by the walls of said basal portion, said lugs being of approximately right angular form in horizontal section so as to conform to the contours of said corners, each of the arms of said right angular lugs being provided with enlarged extremities having holes formed therein, legs having portions of a cross section complemental to the contours of said lugs, and means passed through the holes of said lugs and through said legs to removably secure the legs in place.

In witness whereof, I hereunto subscribe my name to this specification.

HOWARD F. SNYDER.

The Maytag dyratator. This principle of washing [illegible] by Maytag. [illegible] cleanses the fabrics

The square, one-piece, cast aluminum tub, that will not chip, dent, rust. Keeps the wash [illegible] the wash-ings. Mfd. by The Maytag Co.

The hinged, aluminum, table lid, when open, serves as a convenient sorting tray. A flip of the hand will lift or drop the lid.

Sediment trap under dyratator collects loosened grime, freeing water from sediment. Gravity drain hose empties tub completely.

Lifetime, oil-packed, enclosed power drive. Needs no oiling, no adjustment. As carefully built as the transmission of a fine car

THE MAYTAG COMPANY

vs.

GENERAL ELECTRIC SUPPLY CORPORATION

IN EQUITY 7292

DEFENDANT'S EXHIBIT

Single Operating Control

Instant Tension Release

Machine-Cut and [illegible]

Jaw Coupling

Cold-Drawn Steel Wringer Drive Shaft

Cast-Aluminum Gyratator

Sleeve Coupling

Malleable Connecting Rod

Steel Worm Hardened and Precision Ground

Adjustable Bearing Cap

Thrust Bearing Cap

Heat-Treated Worm Gear with Eccentric

Worm-Wheel Shaft, Hardened and Precision Ground

Worm Shaft, Precision Ground

V-Belt Drive

Adjustable Motor Base

Mono-Form Heavy Steel Base

Rubber Caster

Swinging, Reversible Non-Crush Roller Water Remover with Flexible Upper Roll and Firm Bottom Roll

One of the Four Equalizing Tension Springs

Water Remover with Enclosed Automatic Aluminum Drain Plate

Shifter Lever

Polished Aluminum Crown

One-Piece Cast-Aluminum Tub

Sediment Zone

Drain Hose

Steel Clutch

Precision Machine-Cut Steel Pinion

Heat-Treated Precision Machine-Cut Gear Segment

⅛ H. P. Rubber Insulated Electric Motor

Motor Board

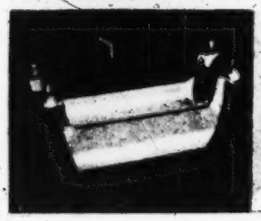
Adjustable Extension Legs

Enclosed Transmission Drive-Unit Is Oil-Packed and Sealed

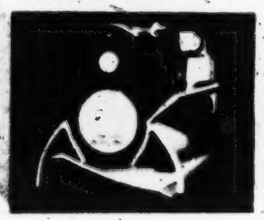
DEFENDANT'S EXHIBIT 11. 1031

THE WORLD'S FINEST WASHER

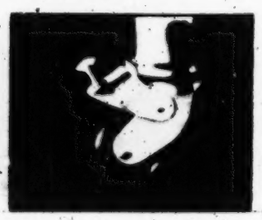
New Maytag Roller Water Remover. Improved 4 point equalizing tension greatly increases compactness, efficiency and flexibility.



The combination of flexible upper and firm lower rolls evenly dries garments, spares buttons, leaves no hard-to-iron wrinkles.

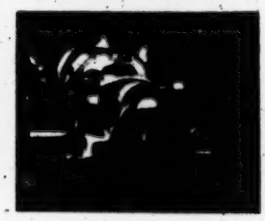


The legs of the Maytag are adjustable so that washer will suit the height of operator. Equipped with large, rubber casters.



For homes without basement drains the Maytag is available with discharge pump, in place of gravity drain, at small additional cost.

The Maytag is available with in-built ¼ h.p. Multi-Motor engine, in place of electric motor, at a reasonable additional cost



DEFENDANT'S EXHIBIT 11.

Why WORLD Leadership

Phone

★ Phone today and arrange for a free trial Maytag washing in your own home. No cost or obligation on your part. Convenient payment terms are available, if desired.

THE MAYTAG COMPANY
Founded 1893 Manufacturers Newton, Iowa
THE MAYTAG CO., Ltd., Winnipeg, Canada

On display and demonstration in the show rooms of the New York Edison Co., Inc.

Manhattan
20 Norfolk St. • 270 Canal St.
4 Irving Place 212 West 57th St.
236 West 72nd St.
151 East 86th St.
15 East 125th St.
21 Audubon Ave.
Bronx
362 East 149th St.
555 East Tremont Ave.
310 East Kingsbridge Rd.

Form 481 © The Maytag Company

★ This is the Maytag Aluminum Washer. This is the washer you have always wanted to own. This is the washer that gave Maytag world leadership.

BECAUSE MAYTAG ORIGINATED AND *Perfected* A SUPERIOR WASHER . . .

★ Back in 1922 Maytag announced a new washer . . . different from any other in design and construction . . . a washer that would wash clothes clean by water action alone. Today, the success of this washer is history. It is saving time, money and clothes in millions of homes. Maytag attained world leadership because it originated and perfected a superior washer for home laundering. Maytag has retained that leadership because it has continued to make the world's finest washer — year after year.

MAYTAG

BECAUSE YOUR HOME DESERVES THE BEST AUTOMOBILE ★ ★ ★.

DEFENDANT'S EXHIBIT 12.

U. S. D. C. W. D. Mo. W. D.

THE MAYTAG COMPANY

vs.

GENERAL ELECTRIC SUPPLY CORPORATION

IN EQUITY 2392

DEFENDANTS EXHIBIT 12

Maytag

INTER-FACTORY COMMUNICATION

October 16th 1921

F.L. Maytag
Chairman of The Board.

I want you to know that as soon as you return you can see the new washer in operation at Mrs Ellingsworths. As I mentioned to you I have put the agitator in the bottom of a model 70 aluminum tub and it gives much better water action than in the flat bottom wood tub. I also added another blade.

I have heard nothing yet from Mr. Blanks in regard to the Cushman engine on the bug machine and thought maybe you might care to write him if you think he has returned to Texas yet.

Howard E. Snyder

DEFENDANT'S EXHIBIT 13.

U. S. D. C. W. D. Mo. W. D.

THE MAYTAG COMPANY

vs.

GENERAL ELECTRIC SUPPLY CORPORATION

IN EQUITY 2892

DEFENDANTS EXHIBIT 13

BOOK OF PRIOR PATENTS

1356 (Part of Defendant's Exhibit 13.)

(U. S. Letters Patent No. 1,496,305 to H. W. Doughty, et al., June 3, 1924.)

1040

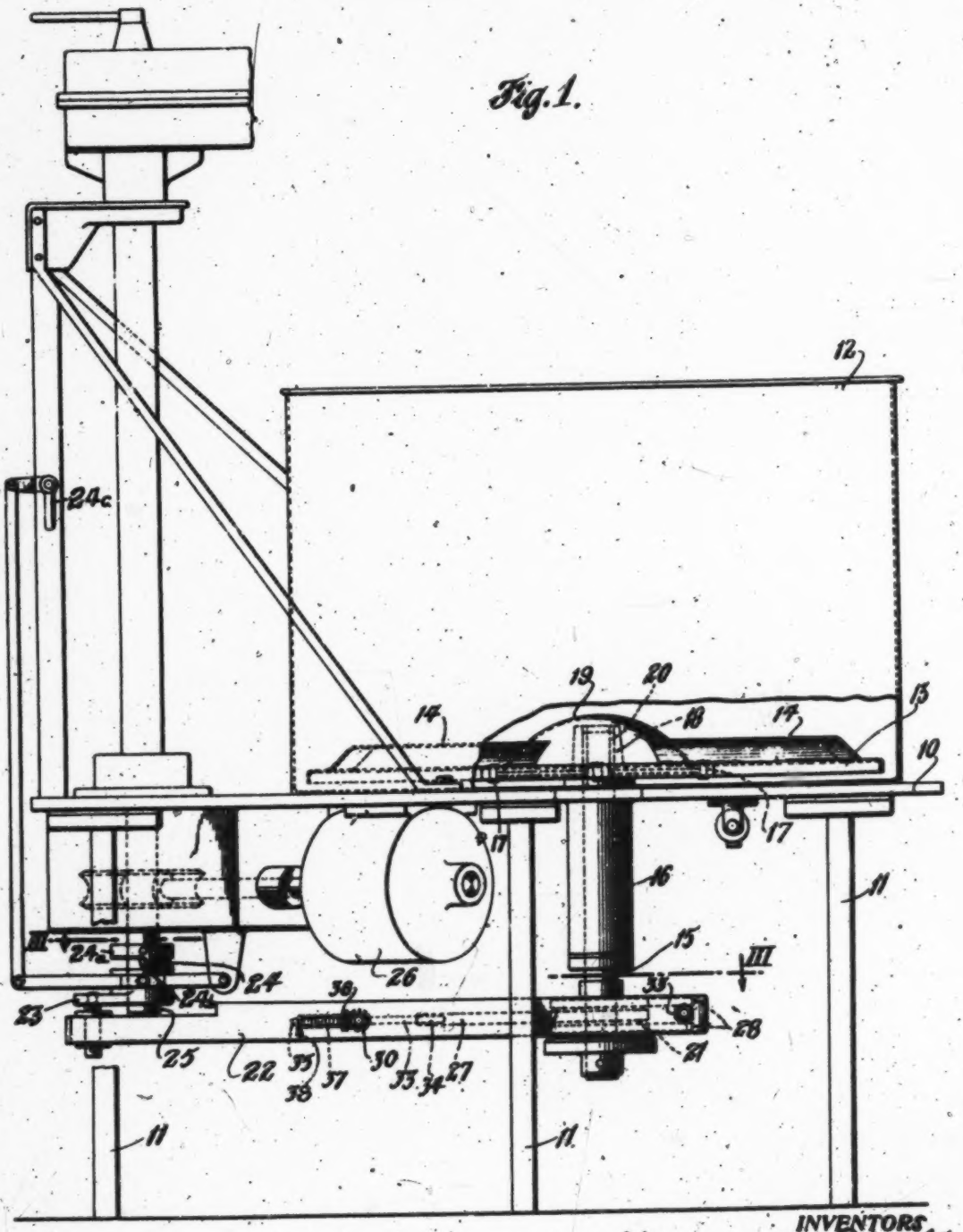
June 3, 1924. 1,496,305

H. W. DOUGHTY ET AL

WASHING MACHINE

Filed April 8, 1922 2 Sheets-Sheet 1

Fig. 1.



INVENTORS
Hezman W. Doughty
George L. Davis

BY
Merrell C. Clark
ATTORNEY

1042 June 3, 1924. 1,496,305

H. W. DOUGHTY ET AL

WASHING MACHINE

Filed April 8, 1922 2 Sheets-Sheet 2

Fig. 3.

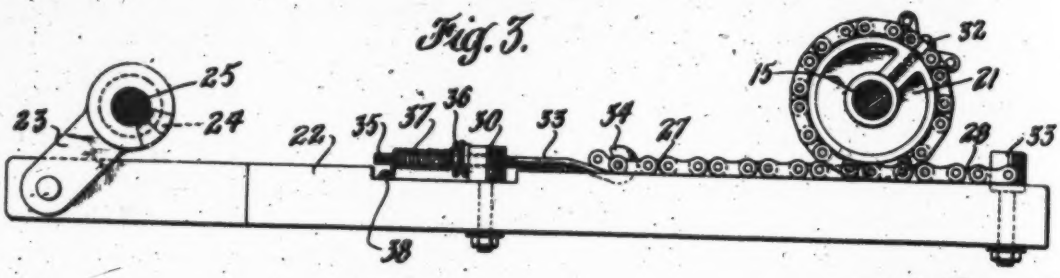


Fig. 4.

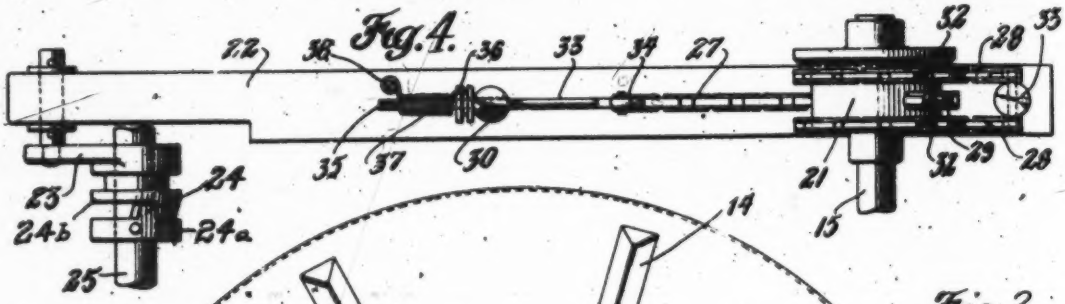


Fig. 2.

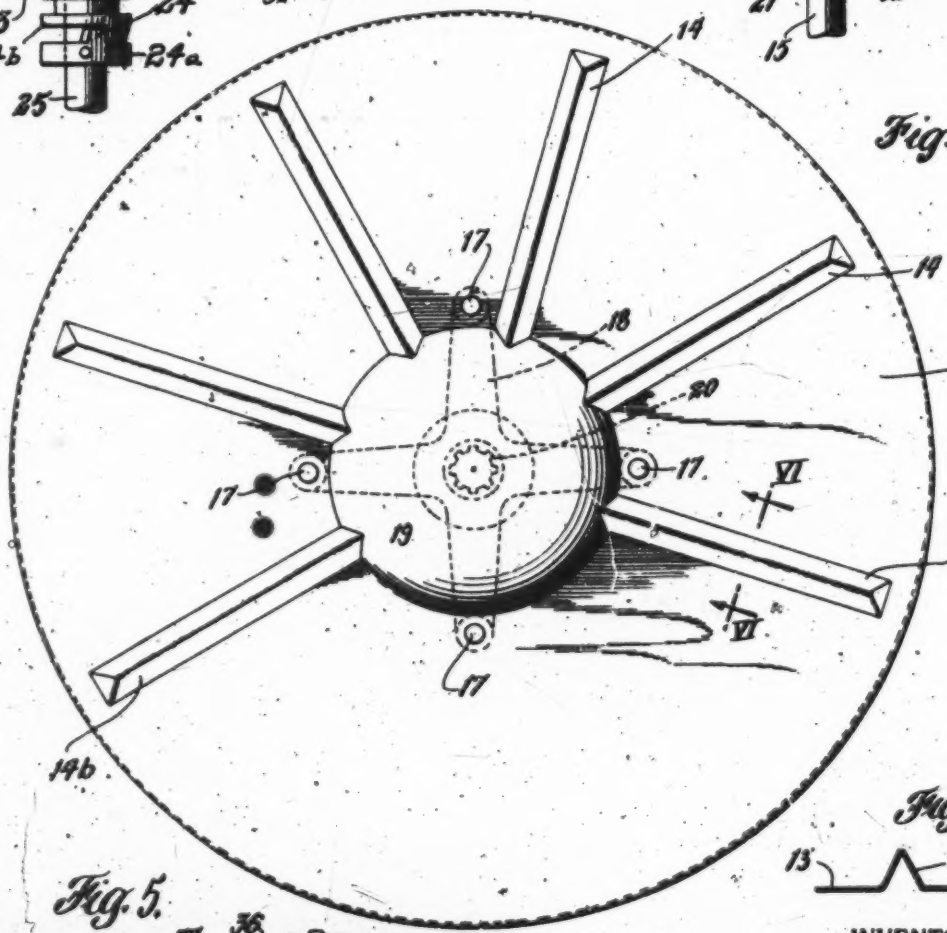


Fig. 6.

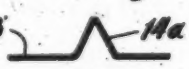
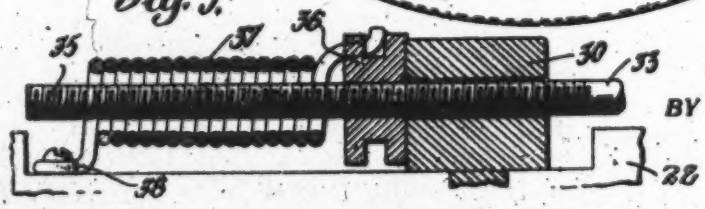


Fig. 5.



INVENTORS
Herman W. Doughty
George L. Davis
BY
Merrell C. Clark
ATTORNEY

Patented June 3, 1924. 1,496,305

1043

UNITED STATES PATENT OFFICE.

HERMAN W. DOUGHTY AND GEORGE L. DAVIS, OF BINGHAMTON, NEW YORK, ASSIGNORS TO THE NINETEEN HUNDRED WASHER COMPANY, OF BINGHAMTON, NEW YORK, A CORPORATION OF NEW YORK.

WASHING MACHINE.

Application filed April 8, 1922. Serial No. 550,607.

To all whom it may concern:

Be it known that we, HERMAN W. DOUGHTY and GEORGE L. DAVIS, citizens of the United States, and residents of Binghamton, county of Broome, and State of New York, have jointly invented certain new and useful Improvements in Washing Machines, of which the following is a description.

This invention relates to washing machines for washing clothes, and particularly to machines of this character which are operated by power as distinguished from hand-operated machines. Certain features of our invention, however, are applicable alike to machines of both of these types, as will appear hereinafter.

The primary object of our invention is to provide a machine of the character described, which shall be at once accessible, convenient and efficient.

The particular type of machine illustrated and described herein is what is sometimes called the "agitator" type. That is to say, it includes a stationary tub for receiving the clothes to be washed and the cleansing fluid, such as soapy water, and a movable "agitator" within the tub and adapted by its movement to agitate the cleansing fluid and the clothes and thus cause the cleansing fluid to penetrate the clothes and clean them. Heretofore the agitator in machines of this type has generally been so arranged as to overlie the clothes during the washing operation. This has made it necessary to remove the agitator before clothes could be placed in the tub or removed therefrom. In order to eliminate this inconvenience we have placed the agitator adjacent the bottom of the tub, so that it underlies the clothes, and we have discovered that an agitator so placed is more efficient if of an unsymmetrical design.

Accordingly it is one object of our invention to provide an agitator which is adapted to underlie the clothes, and which is so designed as to render it highly efficient.

Another object of our invention is to provide novel and efficient actuating means for the agitator.

Still another object of our invention is to provide improved means for mounting the agitator on its actuating shaft.

With these and other objects in view, as will appear hereinafter, our invention consists in the parts, combinations and devices described herein, and more particularly defined in the appended claims.

Referring to the drawings:

Fig. 1 is an elevation of our improved machine, partly in section;

Fig. 2 is a plan of the agitator;

Fig. 3 is a horizontal sectional view taken on the line III—III of Fig. 1;

Fig. 4 is an elevation of the parts shown in Fig. 3;

Fig. 5 is an enlarged sectional view of the chain tightening device shown in Figs. 3 and 4; and

Fig. 6 is a sectional view on line VI—VI of Fig. 2.

In the drawing 10 designates the frame for supporting our improved machine, which frame may be of any suitable design, as for example, that shown in the drawing (Fig. 1) wherein it is provided with three supporting legs 11. Upon this frame is mounted the tub 12, which may be of any desired shape and construction. As herein shown the tub is cylindrical in design. It is open at the top where it is preferably provided with a removable or hinged cover (not shown).

Located within the tub in such a position that it is adapted to underlie the clothes is the agitator 13, which is provided on its upper surface with agitating means such, for example, as the radially arranged vanes or ribs 14. In the particular construction shown these vanes or ribs are struck up from the sheet metal of which the agitator is made. They may, however, be of any other suitable construction, such for example as wooden ribs secured in any desired manner to a wooden or metal agitator.

The agitator 13 is of the rotary type, means (which we will describe later) being provided for oscillating it through the vertical shaft 15. This shaft 15 projects through the bottom of the tub 12. Leakage is prevented by the provision of a stuffing box such as indicated at 16. We preferably mount the agitator on the shaft 15 in the following manner. We secure the agitator 13 in any suitable manner, as indicated at 17, to a spider 18 of any suitable rigid material, the agitator being preferably domed at the center, as indicated at 19, so as to overlie the spider. This spider 18 in turn

is adapted for splined engagement with the shaft 15 as indicated at 20. By this construction we have provided means whereby the agitator is normally connected to oscillate with the shaft 15, but is adapted to be readily removed therefrom, for the purpose of cleaning the tub and the like, by merely lifting it off.

Referring now particularly to Fig. 2, it will be noted that the vanes or ribs 14 are unsymmetrically arranged. The purpose of so arranging the vanes is that we have found that if the agitator surface is symmetrical there is a marked tendency for a single one of the many pieces of laundry in the tub to cling to the agitator, an action which interferes seriously with the efficiency of the machine in washing. This action is apparently due to the fact that the oscillation of the agitator sets up currents in the fluid contents of the tub which move centrifugally of the agitator. And if the agitator is symmetrical these currents act with substantially equal force throughout the periphery of the agitator and tend to stretch the most available piece of laundry over the surface of the agitator and keep it there.

We have discovered, however, that by arranging the agitator unsymmetrically the equality of the currents is disturbed and as a result the piece of cloth in contact with the agitator will not be retained there but will be moved off to one side by the unequal currents acting upon it.

Many different unsymmetrical designs of agitators will accomplish this result and therefore come within the scope of our invention. The particular unsymmetrical design illustrated in Fig. 2 is formed by spacing one consecutive pair of vanes, such for example as the vanes 14^a, 14^b, farther apart than other similar pairs. We have found that by using an agitator of this type no single piece of cloth remains in contact with the agitator for an undue length of time.

Coming now to the means for actuating the agitator, we provide the shaft 15 at a point below the bottom of the tank 12 with a drum 21 (Figs. 1, 3 and 4). Mounted adjacent this drum is the connecting rod 22 which is adapted to be reciprocated by the crank 23. This crank 23 is controlled by the clutch 24 and when the clutch is engaged the crank 23 is rotated by the vertical shaft 25, which in turn is operated by the motor 26, or any other suitable source of power.

The clutch 24 which we have provided is novel, so far as we are aware. It comprises the collar 24^a which is pinned or secured in any other desired manner to the vertical shaft 25, and the collar 24^b which is integral with the crank 23 loosely mounted on said shaft. The collars 24^a, 24^b, have coacting clutch teeth which, when the crank is elevated as shown in Fig. 1, engage to drive the crank. When, however, the crank is depressed the teeth are disengaged and the crank remains idle. Any suitable and convenient means, such as the hand lever 24^c with its connections may be employed for elevating and depressing the crank 23 to engage and disengage the clutch.

The advantage of the clutch which we have described above resides primarily in its ease and economy of manufacture. It requires no keys, keyways or splines. All that is necessary, so far as the shaft 25 is concerned, is the securing of the collar 24 thereto, as by means of the pin illustrated.

The means for operatively connecting the connecting rod 22 to the drum 21, as herein shown, comprise two flexible members 27, 28. The member 27 may be in the form of a single chain 27, one end of which is secured to the drum at 29 and the other end of which is secured to the connecting rod 22 at a point 30 which is toward the crank end of the latter. The other flexible member 28 may be in the form of a double chain, one end of which is secured to the drum at the point 32 and the other end of which is secured to the connecting rod 22 at the point 33 which is at or toward the free end of the connecting rod. As will appear from the drawing, the flexible members 27 and 28 are so arranged that they are adapted to wind up on the drum 21 in opposite directions.

By virtue of the construction just described the drum 21 and through it the agitator 13 are oscillated in a regular and quiet manner.

In the course of continued oscillation of a part such as the agitator 13, considerable strain is placed upon the driving means, due largely to the rather sudden reversals in the direction of movement of the parts. As a result, if no provision were made to guard against it, the flexible members might become loose. The result would be an inefficient and noisy drive. Accordingly, we have provided means for automatically taking up any slack that may occur in the flexible members.

This automatic take-up means, as herein shown, comprises a bolt 33', one end 34 of which is adapted to engage the flexible member 27 and the other end 35 of which passes through the eye 30 secured to the connecting rod 22. The end 35 is screw threaded and provided with a nut 36 which, in cooperation with the eye 30, secures the flexible member 27 to the connecting rod. For keeping this nut 36 tight we provide a spring such as 37, (Figs. 3, 4 and 5), one end of which is secured to the connecting rod 22 at 38 and the other end of which engages a

notch in the nut 36. During the reciprocation of the connecting rod 22 there are intervals of time, such as those occurring upon the reversal of movement, during which the flexible members are not subjected to tension by the normal operation of the machine. At such times, if there is any slack in the flexible members, the spring 37 will rotate the nut 36 and take it up. Thus the arrangement described serves to maintain the flexible members 27, 28, taut at all times.

The washing machine herein shown has been found in practice to be very efficient as a clothes washing mechanism and very convenient to operate and keep clean. The agitator being at the bottom and there being no obstruction in the tub above the agitator, it is a very simple matter to place clothes in the tub and to remove them therefrom. We are aware that agitators or dollys have heretofore been placed adjacent the bottom of the stationary tub of a washing machine. But so far as we are aware we are the first so to arrange the operating mechanism of an agitator which is located adjacent the bottom of the tub that there is no obstruction above the agitator. Also, the agitator as a whole may be readily removed from the tub when desired, for the purpose of cleaning.

The actuating mechanism which we have provided for oscillating the agitator are particularly efficient and noiseless in operation, due in part to the automatic take-up means which we have provided.

The terms and expressions which we have employed are used as terms of description and not of limitation, and we have no intention, in the use of such terms and expressions, of excluding any mechanical equivalent of the features shown and described, or portions thereof, but recognize that various modifications are possible within the scope of the invention claimed.

What we claim is:

1. In a washing machine, a container, an agitator located therein, and means for actuating said agitator, said agitator including a plurality of vanes of which those located at one portion of the agitator are spaced differently than the remainder.

2. In a washing machine, a container, an agitator located therein, and means for actuating said agitator, said agitator including a plurality of vanes between one consecutive pair of which there is a greater distance than there is between certain other consecutive pairs.

3. In a washing machine, a container, an agitator located adjacent the bottom thereof, and means for oscillating said agitator, said agitator being provided on its upper surface with a plurality of radially disposed vanes between one consecutive pair of which there is a greater distance than there is between certain other consecutive pairs.

HERMAN W. DOUGHTY.
GEORGE L. DAVIS.

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PART OF DEFENDANT'S EXHIBIT 13.
RESERVE COPY

N° 18,202 A.D. 1891

Date of Application, 23rd Oct., 1891
Complete Specification Left, 21st July, 1892—Accepted, 1st Oct., 1892

PROVISIONAL SPECIFICATION.

Improvements in Washing Machines.

I ELIZA JANE JARDINE of Dromore in the County of Down in Ireland Spinster do hereby declare the nature of this invention to be as follows:—

My invention relates to machines employed in the cleansing of linen cambric and other similar materials which are liable to damage by being caught between the rim or bottom of the machine and the dolly.

In order to prevent such damage I employ a horizontal ring set and bolted into a groove in the bottom of the machine and furnished with perpendicular pins and springs which support a flanged or tongued hoop or rim equal in circumference to the periphery of the dolly.

I provide the flange or tongue of the hoop or rim with sockets into which the pins pass so as to prevent the movement of the hoop or rim in a lateral direction.

The springs keep the flanged or tongued hoop or rim in contact with the rim of the dolly so that there is not any interval between them for the materials being cleansed to be caught in and damaged by.

I may, however, keep the flanged or tongued hoop or rim in position by other means than perpendicular pins.

Dated this 22nd day of October 1891.

HYNDMAN & DICKSON,
6, Chichester Street, Belfast, Agents for Applicant.

COMPLETE SPECIFICATION.

Improvements in Washing Machines.

I ELIZA JANE JARDINE of Dromore in the County of Down in Ireland Spinster do hereby declare the nature of this invention and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement:—

My invention relates to machines employed in the cleansing of linen, cambric and other similar materials which are liable to damage by being caught between the rim or bottom of the machine and the dolly and is specially applicable to machines consisting of a circular tub or vessel with vertical ribs or projections on its inner surface and of a dolly composed of a disc with an elongated boss or centre carrying projecting ribs and caused to rotate in each direction alternately and reciprocally.

In order to prevent such damage as I have mentioned I employ a horizontal stationary ring set into a groove in the bottom of the machine and furnished at intervals with perpendicular pins and springs which stay or control and support a flanged or tongued hoop or rim equal in circumference to the periphery of the dolly.

I provide the flange or tongue of this hoop or rim with sockets into which the perpendicular pins pass so as to prevent the movement of the hoop or rim with the dolly in a lateral direction.

The springs keep the flanged or tongued rim in contact with the rim of the dolly so that there is not any interval between them for the materials being cleansed to be caught in and damaged by, while the elasticity of the supports of the stationary hoop or rim allows it also to adjust itself to variations in the vertical position of the dolly.

[Price 8d.]

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In constructing my improved machine for practical use I have made some modifications in my arrangements which I prefer. According to these modifications, instead of placing the dolly above the horizontal ring and flanged or tongued hoop or rim, I enclose it within them and furnish it, on its upper surface, with a horizontal projecting circular flange against the under surface of which the flanges or tongues of the hoop or rim is pressed into close contact by means of the supporting springs so as to form a close fitting joint between them.

This hoop or rim is provided on the under surface with cavities or sockets to receive the perpendicular pins and springs which are fixed in a grooved or flanged horizontal stationary ring attached to the bottom of the tub or vessel and enclosing the flanged or tongued hoop or rim. I may employ additional springs at intervals independently of the perpendicular pins and the hoop or rim may be slotted, grooved or perforated between the pins and springs for the purpose of making it lighter.

And in order that my said invention may be more fully understood I shall now proceed to refer to the figures and letters upon the several sheets of drawings hereunto annexed the same letters of reference indicating the same or corresponding parts of my improved washing machine throughout all the figures.

Fig. 1 is a plan of a circular washing machine with vertical ribs and a dolly having an elongated boss or centre with projecting ribs and it shows the disc provided with a horizontal projecting circular flange, the rim of the disc or base being indicated by a dotted line on the flange. The positions of the perpendicular pins and springs are indicated by small circles also on the flange.

Fig. 2 is a cross section of the same machine and dolly which shows the horizontal projecting circular flange on the upper surface of the disc or base of the dolly, the hoop or rim with its flanges or tongues in contact with the under surface of the horizontal projecting circular flange and furnished with sockets to receive and stayed or controlled and supported by perpendicular pins and springs fixed in a grooved or flanged ring attached to the bottom of the tub or vessel and enclosing the flanged or tongued hoop or rim and

Fig. 3 is an enlargement in section of the periphery of the dolly's disc or base, the horizontal projecting circular flange, a cavity or socket in the hoop or rim and the grooved or flanged ring attached to the bottom of the tub or vessel and furnished with a pin and spring to stay or control and support the hoop or rim.

a is the tub or vessel with vertical ribs or projections, a^1, a^1, and a^2 is the grooved or flanged ring attached to the bottom of the tub or vessel, a; b is the disc or base of the dolly and b^1 the elongated boss or centre on its upper surface, with the projecting ribs b^2, b^2; b^3 is the horizontal projecting circular flange on the disc or base of the dolly b; c is the hoop or rim with its flanges or tongues, c^1 c^1, kept in close contact with the under side of the horizontal projecting circular flange, b^3, by means of the springs, c^2, and prevented from moving in a lateral direction by means of the perpendicular pins, c^3, c^3, and c^4 is one of the sockets into which the springs, c^2, and the perpendicular pins, c^3, pass for the purposes above mentioned.

Having now particularly described and ascertained the nature of my said invention and in what manner the same is to be performed I declare that what I claim is

1. The use, in circular washing machines with a revolving or reciprocating dolly, of a non-revolving hoop or rim arranged with flanges and sockets, stayed and controlled by perpendicular pins and supported on springs substantially in the manner and for the purposes hereinbefore described and shewn in the drawings hereunto annexed.

2. The use, in circular washing machines with a revolving or reciprocating dolly, of a grooved ring or a groove arranged with perpendicular pins and springs substantially in the manner and for the purposes hereinbefore described and shewn in the drawings hereunto annexed and

3. The combination and arrangement of parts constituting my improved washing machine constructed and employed substantially in the manner and for the purposes hereinbefore described and illustrated by the drawings on the sheet hereunto annexed.

Dated this 20th day of July 1892.

HYNDMAN & DICKSON,
6, Chichester Street, Belfast, Agents for Applicant.

London: Printed for Her Majesty's Stationery Office, by Darling & Son, Ltd.—1892

[This Drawing is a reproduction of the Original on a reduced scale]

SHEET 1

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FIG. 2.

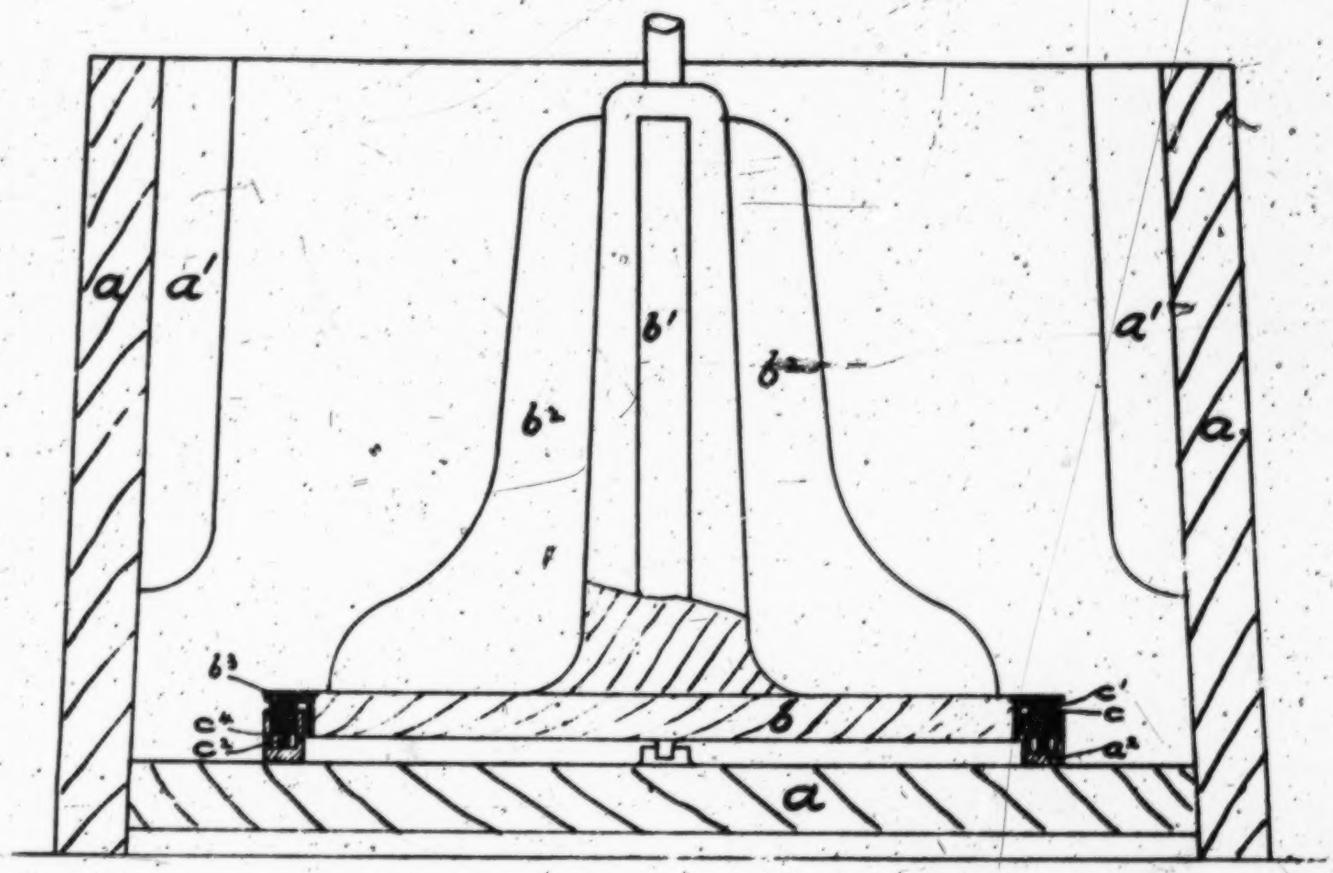


FIG. 1

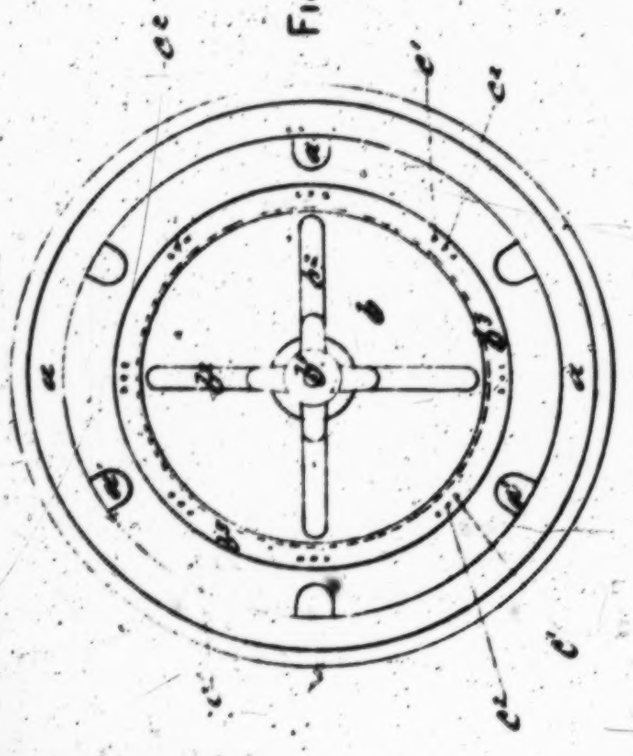
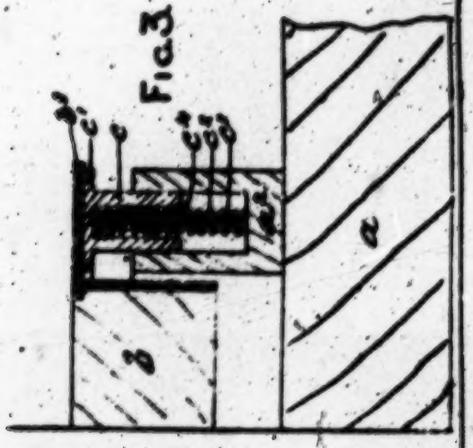


FIG. 3



HARDINGE Chemists Registration.

1365 (Part of Defendant's Exhibit 13.)

(U. S. Letters Patent No. 1,240,826 to G. L. Davis, September 25, 1917.)

1056

G. L. DAVIS.

AGITATOR FOR WASHING MACHINES.

APPLICATION FILED FEB. 29, 1916.

1,240,826. Patented Sept. 25, 1917.

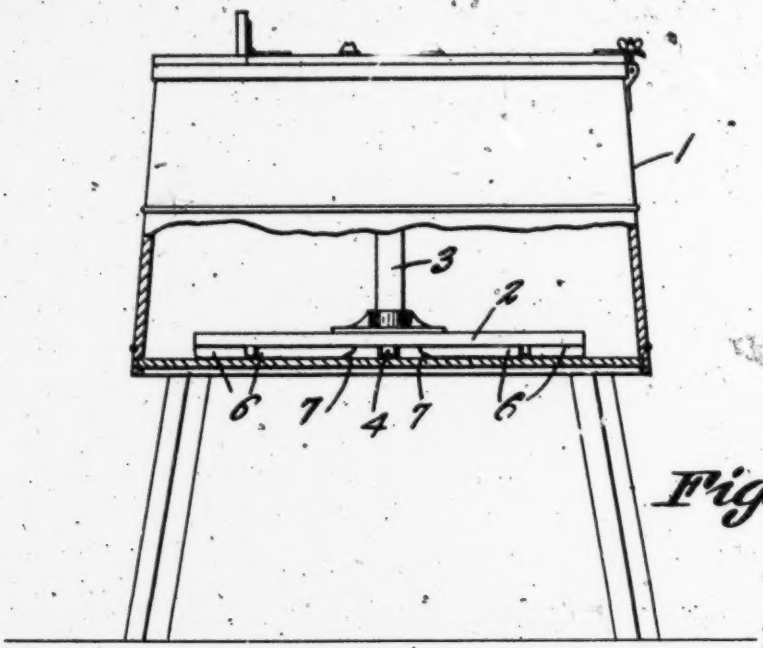


Fig. 1.

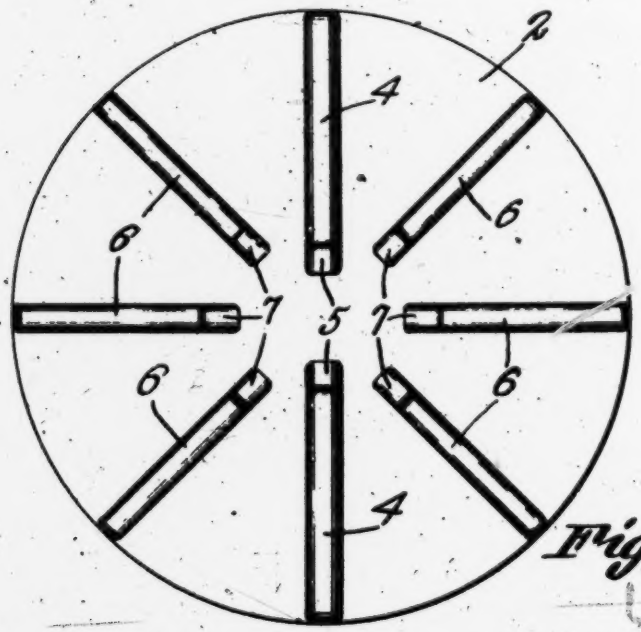


Fig. 2.

Witnesses

J. C. Fowler

R. L. Parker.

G. L. Davis, Inventor

by C. A. Snow & Co.

Attorneys

UNITED STATES PATENT OFFICE.

GEORGE L. DAVIS, OF BINGHAMTON, NEW YORK.

AGITATOR FOR WASHING-MACHINES.

1,240,826. Specification of Letters Patent. Patented Sept. 25, 1917.

Application filed February 29, 1916. Serial No. 81,200.

To all whom it may concern:

Be it known that I, GEORGE L. DAVIS, a citizen of the United States, residing at Binghamton, in the county of Broome and State of New York, have invented a new and useful Agitator for Washing-Machines, of which the following is a specification.

This invention relates to agitators for washing machines, the same being of the disk type designed for rotation back and forth within the tub of a washing machine.

One of the objects of the invention is to provide an agitator having a novel arrangement of ribs or vanes on the lower or active face thereof and which operate to direct the water outwardly by centrifugal force, thereby setting up a circulation downwardly within the tub adjacent the wall thereof, and thence upwardly through the fabrics in the tub and to the center of the space below the agitator.

A further object is to provide an agitator designed to float upon the water contained within the tub and the ribs on which will not only serve to set up a circulation of water as stated, but will also rub lightly upon the fabrics without danger of injuring them.

A still further object of my invention is to provide means in connection with the agitator disk to prevent churning of the washing fluid, and other means also in connection with said disk to cause the fluid flow lines to substantially conform to the shape of an elongated loop depressed intermediate its ends.

With the foregoing and other objects in view which will appear as the description proceeds, the invention resides in the combination and arrangement of parts and in the details of construction hereinafter described and claimed, it being understood that changes in the precise embodiment of the invention herein disclosed, can be made within the scope of what is claimed, without departing from the spirit of the invention.

In the accompanying drawings the preferred form of the invention has been shown.

In said drawings:—

Figure 1 is a view partly in side elevation and partly in section of a washing machine having the present improvements combined therewith.

Fig. 2 is a bottom plan view of the agitator.

Referring to the figures by characters of reference 1 designates a tub of the inverted type (of greater diameter at the bottom than at the top), and arranged within the tub so as to rotate backwardly and forwardly is a disk 2 which can be driven in any manner desired, as by means of a shaft 3 connected to a suitable motor, not shown. This disk is provided on its lower or active face with opposed alining ribs 4 having their inner ends beveled as at 5, while their outer ends are substantially flush with the margin of the disk 2. Arranged at opposed sides of the ribs 4 and groups of radiating ribs 6 regularly spaced and having their inner ends beveled as at 7 while their outer ends are substantially flush with the margin of the disk 2. The inner ends of these ribs 6 are arranged in the arc of a circle, while the opposed ribs 4 extend inwardly closer to the center of the disk and are somewhat wider than the ribs 6. Thus the inner ends of the ribs 4 act as blades for engaging liquid contained within the circle defined by the inner ends of the ribs 6. Because of this peculiar arrangement of ribs 4 and 6, the fluid is caused to flow in lines similar in shape to an elongated loop depressed intermediate its extremities. The constancy of such flow lines eliminates eddies and other current irregularities preventive of a high degree of efficiency. It will be apparent that all of the spaces formed between the ribs on the disk communicate adjacent the center of the disk between the inner ends of the ribs, and that the lower face of the disk is flat and free of obstructions or projections other than the ribs. The beveled inner terminals of ribs 4 and 6 indicate the substantial configuration of an inverted bowl presenting no acute obstructions to the fluid flow lines consequent of rib depression and centrifugal force.

In using the agitator the tub is partly filled with water, after which the disk 2 is placed above the fabrics in the tub so as to float upon the water. The disk is then rotated backwardly and forwardly and during this movement the ribs 4 and 6 will have two functions. First they will throw the upper portion of the water by centrifugal force toward the wall of the tub, thus creating a suction under the center of the disk, with the result that the water displaced upwardly by this suction will force its way through the fabrics and will create a circulation inwardly adjacent the bottom of the tub and downwardly adjacent the wall thereof.

Thus the fabrics will be thoroughly cleaned without being pulled and distorted, the circulation of the water through the fabrics resulting in the removal of the dirt therefrom. In addition to the foregoing the ribs will act as rubbing elements inasmuch as they will engage lightly with the fabrics thereunder.

As has heretofore been pointed out, importance is attached to the particular construction and arrangement of the ribs on the disk. With this arrangement the shorter ribs 6 operate to throw the water outwardly by centrifugal force, creating a suction into the central space between the inner ends of the ribs. The water brought into this central space is engaged and thrown outwardly by the inner ends of the ribs 4 so that the centrifugal action of the agitator is materially increased by this particular arrangement.

What is claimed is:—

In a washing machine the combination with a tub, of an agitating disk mounted to float on water in the tub, radial vanes upon the lower face of the disk adapted, when the disk is rotated, to direct the upper portion of the water outwardly by centrifugal force toward the wall of the tub and to draw water upwardly from the center of the bottom thereof, and a driving shaft for actuating the disk, said disk being freely movable vertically.

In testimony that I claim the foregoing as my own, I have hereto affixed my signature in the presence of two witnesses.

GEORGE L. DAVIS.

Witnesses:
ORD A. BRAZIL,
A. B. SMITH.

1368 (Part of Defendant's Exhibit 13.)

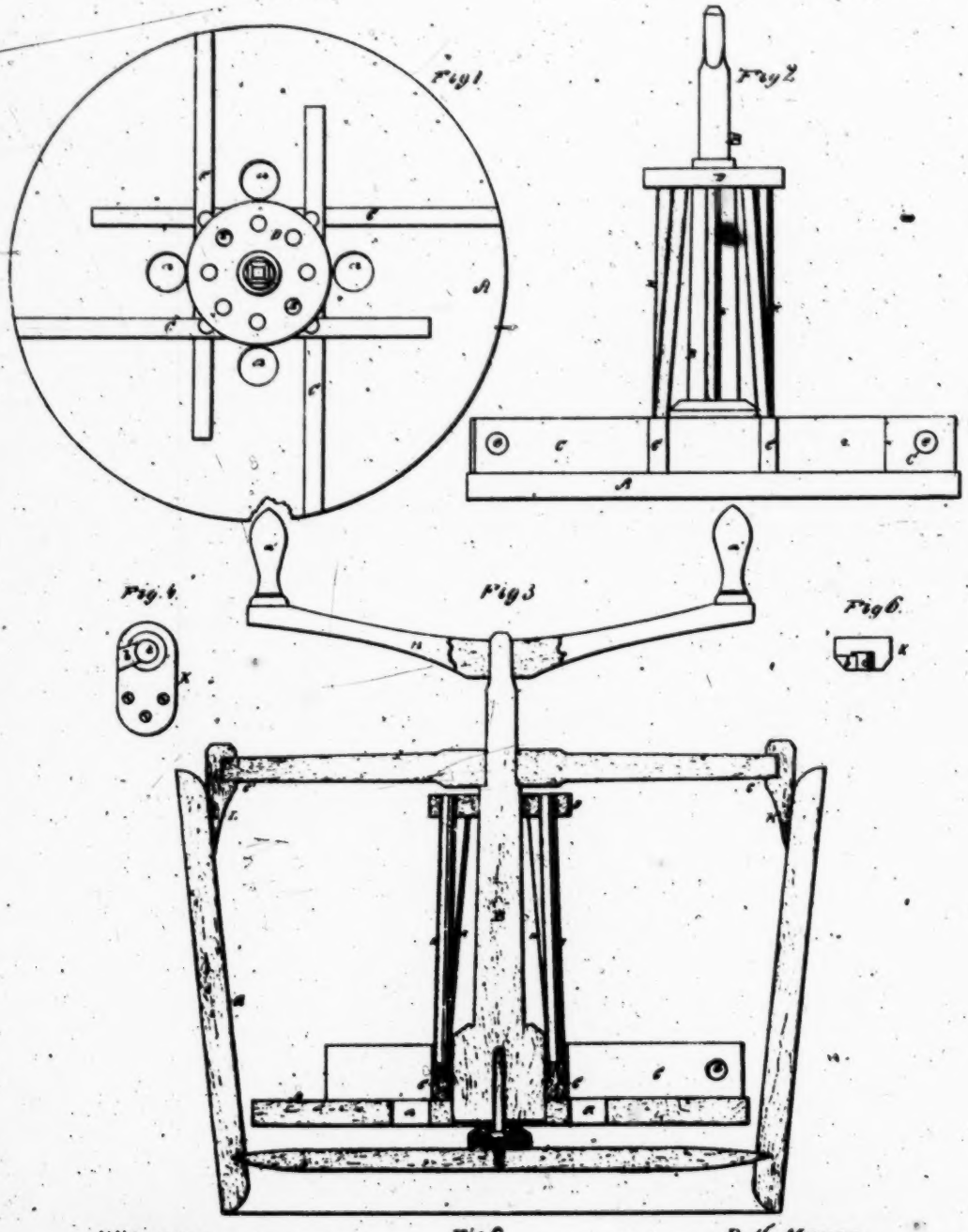
(U. S. Letters Patent No. 106,853 to R. S. Morse, August 30, 1870.)

1060

R. S. Morse,

Washing Machine.

No. 106,853. Patented Aug. 30. 1870.



Witnesses

R. S. Morse

by his attorney.

United States Patent Office.

RUSSELL S. MORSE, OF CHELSEA, MASSACHUSETTS.

Letters Patent No. 106,853, *dated August* 30, 1870.

IMPROVED WASHING-MACHINE.

The Schedule referred to in these Letters Patent and making part of the same.

To all persons to whom these presents may come:

Be it known that I, RUSSELL S. MORSE, late of Wilton, of the State of Maine, but now of Chelsea, of the State of Massachusetts, have invented a new and useful Improvement in Washing-Machines; and do hereby declare the same to be fully represented in the accompanying drawing, and to be described as follows:

Of such drawing—

Figure 1 is a top view;

Figure 2, a side elevation of the dasher; and

Figure 3 is a transverse section of my improved washing-machine.

In such drawing—

A denotes a perforated disk, having not only a round shaft, B, projecting upward from its center, but a series of prismatic arms or slats C C, &c., arranged on its top, and extended therefrom and formed in manner as shown.

The perforations of the disk are exhibited at *a a* as arranged between the arms, and near their junctions.

It will be observed that such arm is at right angles to two others, and extends beyond them in opposite directions, one end of the arm terminating at or close to the periphery of the disk, while the opposite end of the arm is placed at a distance of about half the length of the arm from the next adjacent part of the periphery.

This arrangement of the arms and the disk is very useful, as in practice the arms so disposed will operate so as to aid in preventing the clothes in the tub of the dasher from being moved toward and piled about the shaft, as the centrifugal force generated in the water, and tending to throw it upward at the sides of the tub, will be met and counteracted by lateral currents or forces induced in the water by the arms.

From the series of arms there is extended upward, to a disk or circular head, D, arranged on the shaft, as represented, a series of round bars, E E E, they being arranged at equal, or about equal, distances apart. Their purpose is to aid in washing the clothes, and imparting to them reciprocating rotary motions within the tub G, within which the dasher is arranged, and to which it is pivoted, so as to be capable of being moved therein with a reciprocating rotary movement by a person when hold of the handles *a' a'* of a lever, H, placed upon the upper prismatic part of the dasher-shaft.

The said shaft has a bearing in a cross-bar, I, whose opposite ends are inserted in socket-pieces K L, projecting upward from the upper part of the tub.

One of the socket-pieces, (viz., K,) is provided with a port or passage, *b*, leading out of its socket laterally, but having a depth less than that of the socket, the same being as shown in Figure 4, which is a front view, and in Figure 5, which is a side view, and in Figure 6, which is a horizontal section of the socket-piece, the socket being shown at *c*.

The other socket-piece, L, has simply a round recess or socket, *c*, made in it to receive the end of the cross-bar.

The distance between the bottoms of the two sockets, when attached to the tub, is to be equal, if not a little greater than the length of the bar I, but the distance from the bottom of the entrance passage *b* to the bottom of the socket of the opposite socket-piece is to be somewhat less than the length of the bar I, the whole being to enable the said bar, after having one end inserted in the socket *c* of the last-mentioned socket-piece, to have its other end passed through the passage *b*, and sprung into the socket of the other socket-piece, the inherent elasticity of the tub and the bar enabling such to be effected. This mode of applying the bar to the tub admits of their being easily separated when occasion may require.

The advantages of having the perforation of the disk arranged close about the shaft is, that they enable the water to operate to better advantage by centrifugal force, to prevent deposits of dirt and extraneous matters beneath the disk.

One or more holes, *a*, may be made laterally through each arm near its outer end.

I therefore claim as my improvement in a washing-machine—

The disk A, with its holes *a a*, arms *c*, and the series of bars E, combined and arranged relatively to each other, and with the shaft B, as and to operate in the tub in the manner as explained and represented, the disk and arms under such arrangement being extended horizontally beyond the series of bars E, and combined therewith, so as to revolve with them in one and the same direction, all as shown and described.

RUSSELL S. MORSE.

Witnesses:

R. H. EDDY,
J. P. SNOW.

N° 19,027 A.D. 1889

Date of Application, 27th Nov., 1889

Complete Specification Left, 25th Aug., 1890—Accepted, 27th Sept., 1890

PROVISIONAL SPECIFICATION.

Improvements in Washing Machines.

WILLIAM GEORGE HANNA of 24 Wellington Place Belfast Ireland, Agent do hereby declare the nature of this invention to be as follows:—

The object of this invention is to remedy a defect in washing machines as hitherto made which have vertical rotating blades inside a stationary casing with ribs inside it. The defect being the liability to injure the goods being washed by tearing or nipping them between the revolving disc which forms the base for the revolving blades and the stationary surrounding flange or segment on the inside of the casing.

To prevent the goods that are being washed from being caught in the space between the revolving disc and the stationary internal flange or segment I make the adjacent surfaces of the revolving disc and stationary flange or segment bevelled instead of vertical or horizontal as hitherto made and instead of the rotating blades being entirely within the diameter of the disc, I make a part of the rotatory blades project beyond the rim of the disc but not touching the segment or stationary internal flange, so that when the blades revolve the goods are thrown outwards past the joint between the revolving disc and the internal stationary flange or bevelled segment.

The revolving disc is supported at its outer edge by a ring carried on arms attached to a boss fitted to the vertical spindle.

And to lessen prevent or divert the current of water from passing between the bevelled faces in addition to the holes usually in the revolving disc, I also make holes in the stationary internal flange or segment so as to connect the spaces above and below the disc and stationary flange or segment which surrounds it.

Both the disc and the internal flange or segment I prefer to be made of metal as being less liable to warp or twist out of shape.

Provision is also made for raising or lowering the spindle which carries the disc ring and blades so that the bevelled faces may be made to work as close as desired.

These various devices and improvements effectually prevent the goods in process of washing from being caught or nipped in the space between the disc and flange or segment and remedy an admitted defect in this make of washing machine.

Dated this 25th day of November 1889.

WILLIAM GEORGE HANNA.

COMPLETE SPECIFICATION.

Improvements in Washing Machines.

WILLIAM GEORGE HANNA of 24 Wellington Place Belfast Ireland Agent do hereby declare the nature of this invention and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement:—

The object of this invention is to remedy a defect in washing machines as hitherto made which have vertical rotating blades inside a stationary casing with ribs inside it. The defect being the liability to injure the goods being washed by tearing or nipping them between the revolving disc which forms the base for the revolving blades and the stationary surrounding flange or segment on the inside of the casing.

The means employed to remedy this defect are illustrated in the drawing herewith in which Fig. 1 is a vertical section of the machine and Fig. 2 a horizontal section of the machine which is designed to be driven by a belt. The same letters and figures of reference are employed to indicate the same or like parts.

To prevent the goods that are being washed from being caught in the space between the revolving disc (a) and the stationary internal flange (b) I make the

adjacent surface of the revolving disc (a) and stationary segment or flange (b) bevelled instead of vertical or horizontal as hitherto made and instead of the rotating blades (a^1) being entirely within the diameter of the disc (a) I make a part of the rotating blades (a^1) project beyond the rim of the disc (a) but not touching the segment or stationary internal flange (b) so that when the blades (a^1) revolve the goods are thrown outwards past the joint or space between the revolving disc (a) and the internal stationary flange or bevelled segment (b). The projection of the rotating blades (a^1) throws the goods over the perforations in the segment (b) and so they are between the contrary currents produced by the rotating blades (a^1) and the stationary projections (d) on the inside of the casing.

The revolving disc (a) which is preferably made of copper or other material not liable to corrode is supported at its outer edge by a ring (a^2) carried on arms (a^3) attached to a boss fitted to the vertical spindle (c).

To lessen prevent or divert the current of water from passing between the bevelled faces in addition to the holes usually in the revolving disc (a) I also make holes (b^1) in the stationary internal flange or segment (b) so as to connect the spaces above and below the disc (a) and stationary flange or segment (b) which surrounds it.

Both the disc (a) and the internal flange or segment (b) I prefer to be made of metal as being less liable than wood to warp or twist out of proper shape.

Provision is also made by means of a screw on the foot step (c^1) for raising or lowering the spindle (c) which carries the disc (a) ring (a^2) and blades (a^1) so that the bevelled faces may be made to work as close as possible. These various devices and improvements effectually prevent the goods in process of washing from being caught or nipped in the space between the disc (a) and flange (b) and remedy an admitted defect in this make of washing machine.

Having now particularly described and ascertained the nature of my said invention and in what manner the same is to be performed, I declare that what I claim is:—

In washing machines with blades revolving on a vertical axis making the blades project past the joint between the disc and segment and making the adjacent faces bevelled and also making holes in the segment all as herein described and illustrated.

Dated this 23rd day of August 1890.

WILLIAM GEORGE HANNA.

London: Printed for Her Majesty's Stationery Office, by Darling & Son, Ltd.—1890.

[This Drawing is a reproduction of the Original on a reduced scale]

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A.D. 1869 Nov. 27. N° 19,057.
HANNAN'S Complete Specification.

FIG: 2.

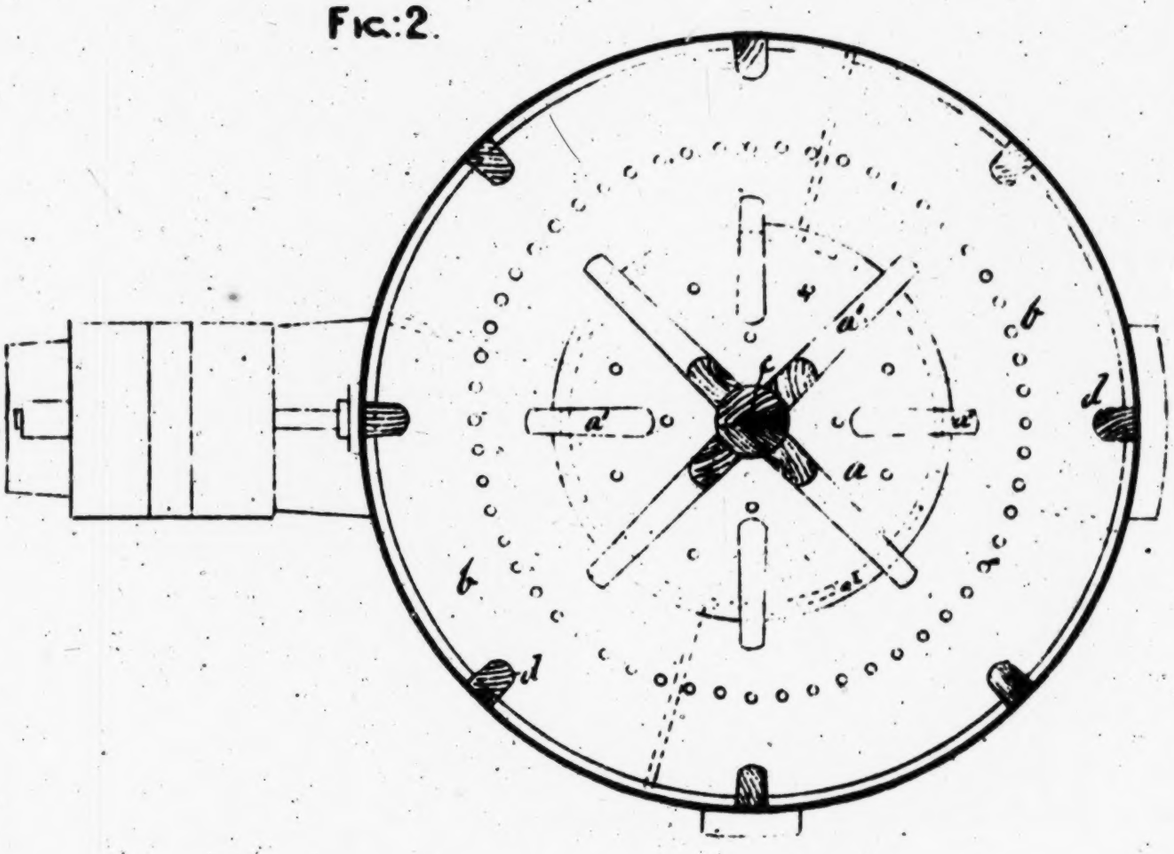
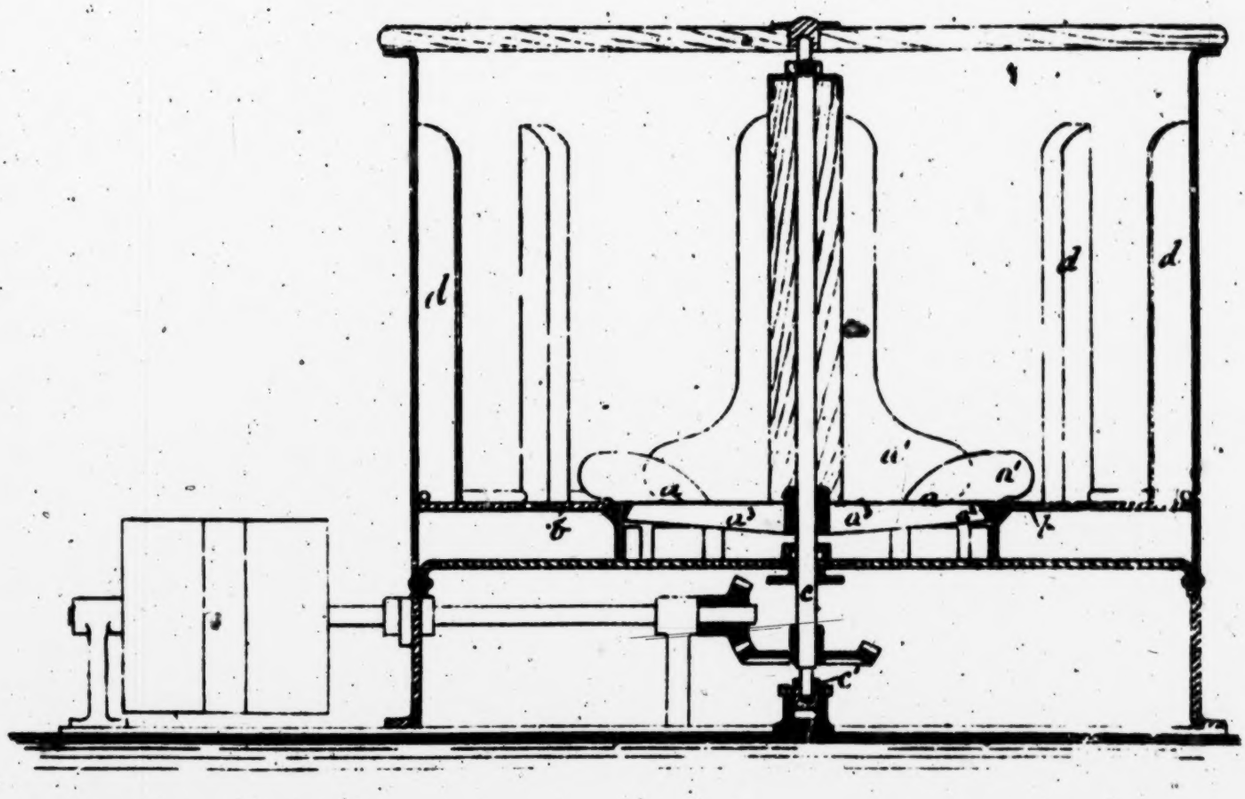


FIG: 1.



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1373 (Part of Defendant's Exhibit 13.)

(U. S. Letters Patent No. 131,629 to J. Runkle, September 24, 1872.)

1070

J. RUNKLE.

Improvement in Washers and Boilers Combined.

No. 131,629. Patented Sep. 24, 1872.

Fig. 1.

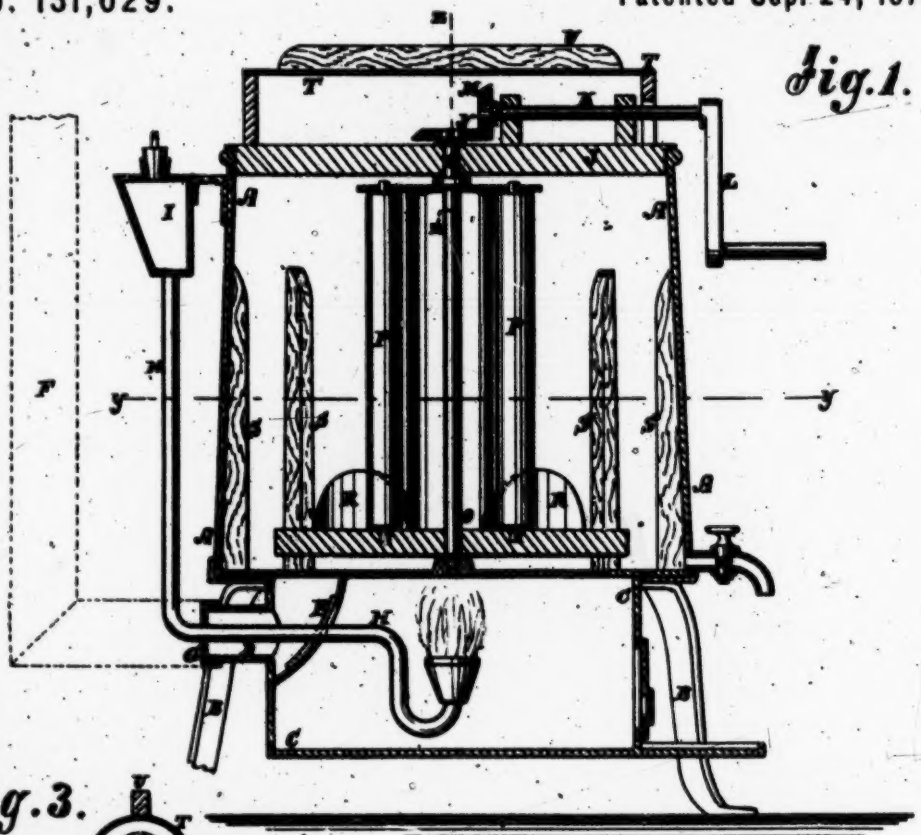


Fig. 3.

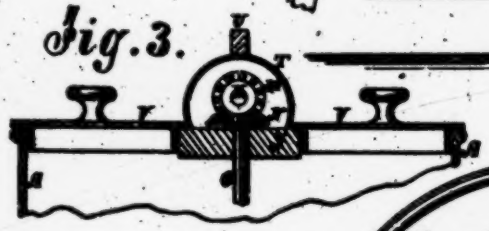
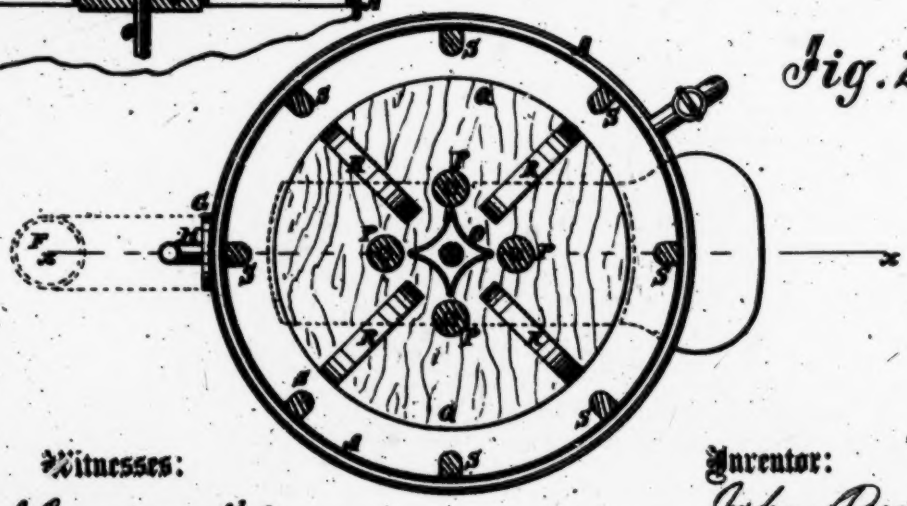


Fig. 2.



Witnesses:

A Bennenendorf.

C. Sedgwick

Inventor:

John Runkle

Per

Munn & Co.

Attorneys.

UNITED STATES PATENT OFFICE.

JOHN RUNKLE, OF READING, PENNSYLVANIA.

IMPROVEMENT IN WASHERS AND BOILERS COMBINED.

Specification forming part of Letters Patent No. **131,629**, dated September 24, 1872.

To all whom it may concern:

Be it known that I, JOHN RUNKLE, of Reading, in the county of Berks and State of Pennsylvania, have invented a new and useful Improvement in Combined Clothes Boiler and Washer, of which the following is a specification:

Figure 1 is a detail vertical section of my improved machine taken through the line *x x*, Fig. 2. Fig. 2 is a detail horizontal section of the same taken through the line *y y*, Fig. 1. Fig. 3 is a detail section taken through the line *z z*, Fig. 1.

Similar letters of reference indicate corresponding parts.

My invention has for its object to furnish an improved machine by means of which the clothes may be boiled and washed at the same time, and which shall be simple in construction, convenient in use, and effective in operation, washing the clothes quickly, thoroughly, and without injuring them; and it consists in the construction and combination of various parts of the machine, as hereinafter more fully described.

A represents a cylindrical vessel supported upon legs B of such a length as to raise the vessel A to such a height that a furnace, C, may be placed beneath it. The furnace C is an ordinary coal or wood furnace, and is made with a plate upon or sutrounding its top, which should be concaved or recessed upon its upper side to allow the products of combustion to come in contact with a larger part of the bottom of the cylinder A before escaping through the flue D. The edge of the projecting top-plate of the furnace C is secured to the edges of the bottom of the cylinder A by lugs and keys, or by other convenient means. The egress-opening from the furnace C is provided with a damper, E, to enable the draft to be regulated at will. When coal or wood is used a pipe, F, is connected with the outer end of the flue D. When kerosene or other liquid fuel is to be used the pipe F is detached and a cap, G, placed upon the outer end of the flue D. In the cap G is formed a hole for the passage of the pipe H, the inner part of which passes through the flue D into the furnace C, and is provided with holes or burners for the effective combustion of the liquid. The outer part of the pipe H passes up along the side of the cylinder A, and its upper end is connected with a reservoir, I, to contain the oil. To the top edges of the vessel A is attached a cross-bar, J, to which are attached bearings for the horizontal shaft K, to the outer end of which is attached a crank, L, for operating the machine. To the inner end of the shaft K is attached a bevel-gear wheel, M, the teeth of which mesh into the teeth of the bevel-gear wheel N attached to the upper end of the shaft O, which passes down through and revolves in bearings in the center of the cross-bar J, and its lower end revolves in a step or socket in the center of the bottom of the vessel A. The body of the shaft O is made square in its general form and with concave sides, as shown in Fig. 2. P are four rollers, one of which is placed opposite each of the corners of the shaft O, and the upper ends of which are pivoted to a plate or spider attached to the upper end of the body of the shaft O. The lower ends of the rollers P are pivoted to the circular plate Q attached to the lower end of the body of the shaft O, so as to be carried around by and with said shaft in its revolution. The circular plate Q is made smaller than the interior of the vessel A; and to its upper side are attached rounded projections, R, which act upon the water and clothes to throw them into violent commotion. To the inner surface of the sides of the vessel A are attached vertical ribs S, which operate, in connection with the projections R and rollers P, to throw the water and clothes into violent agitation and clean the clothes in a very short time. The cross-bar J and gearing K M N are covered with a cap or casing, T, which is provided with an upwardly-projecting flange, U, to which a wringer may be attached. The top of the vessel A, at the sides of the cross-bar J, is covered with segmental covers V, to prevent the water and steam from escaping while the machine is being used.

Having thus described my invention, I claim as new and desire to secure by Letters Patent—

1. The concaved shaft O, rollers P, and rounded projections R, in combination with

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circular plate Q and vessel A, substantially as herein shown and described, and for the purpose set forth.

2. The combination of a furnace, C, whether arranged for solid or liquid fuel, or for both, with the vessel A, provided with the apparatus O P Q R S, substantially as herein shown and described, and for the purpose set forth.

JOHN RUNKLE.

Witnesses:
MATTHIAS MENGEL,
E. C. HIESTER.

RÉPUBLIQUE FRANÇAISE.

OFFICE NATIONAL DE LA PROPRIÉTÉ INDUSTRIELLE.

BREVET D'INVENTION.

XVI. — **Habillement.**

5. — Plissage, nettoyage et repassage.

N° 363.514

Laveuse pour le linge fonctionnant à bras ou au moteur à volonté.

MM. Eugène-Félix HÉMIN et Arthur-Hippolyte BOUGRAND résidant en France.

Demandé le 20 février 1906.

Délivré le 7 mai 1906. — Publié le 2 août 1906.

Cette laveuse pour le linge est disposée de telle façon que l'agitateur disposé verticalement dans la cuve contenant le linge à laver reçoit un mouvement de va-et-vient sous l'action d'une commande à la main, ou bien d'une commande mécanique suivant le cas, le fonctionnement de la laveuse sous l'action de l'une ou de l'autre de ces commandes pouvant avoir lieu sans qu'on ait besoin de démonter aucune pièce, puisqu'il suffit d'agir sur un débrayage et de mettre en place la manivelle pour la commande à bras ou de la retirer.

La combinaison et le fonctionnement de cette laveuse seront bien compris par la description qui va suivre en regard du dessin annexé :

La fig. 1 est une élévation de la laveuse; la fig. 2 est une coupe verticale de la cuve, les organes de transmission de mouvement étant supposés enlevés; la fig. 3 est un plan par-dessous de la laveuse; la fig. 4 en est un plan par-dessus, le couvercle n'étant pas figuré et la fig. 5 est une coupe de la partie supérieure de la cuve montrant bien la tablette servant à égoutter le linge, et le couvercle.

L'appareil se compose d'une cuve en bois dur *a*, dont l'intérieur possède des cannelures *b*, montée sur quatre pieds *c*, pouvant être en bois, fer, fonte, etc., munis ou non de scellements ou équerres pour les fixer au sol. Les douves formant la cuve sont maintenues par quatre cercles en acier *d* dont le supérieur est nervé, dans le but d'empêcher toute déformation de la cuve sous l'action de la lessive. Les joints des douves et du fond sont bouvetés, pour assurer une étanchéité parfaite et supprimer tout risque de dislocation. A sa partie inférieure la cuve possède un robinet de vidange pour l'écoulement de l'eau ou de la lessive après chaque opération.

A l'intérieur et par un trou pratiqué au centre de la cuve s'élève un tube en cuivre *e*, pourvu inférieurement d'une collerette *f*, vissée extérieurement sur le fond. Ce tube est destiné à guider l'axe *i* qui est à l'intérieur; dans ce but, il possède deux bagues en bronze *g*, *h*, l'une à sa partie inférieure, l'autre à sa partie supérieure. On voit également que ce tube a l'avantage d'éviter que l'eau et la lessive ne viennent en contact avec l'axe *i*. Cet axe *i* en fer tourné dépasse le tube *e* par sa partie supérieure, terminée par un carré conique *k*; par sa partie inférieure formant pivot, il repose sur un support à trois branches *n* qui est vissé sur le fond de la cuve.

C'est sur le carré *k* de l'axe *i* que se monte la pièce dénommée agitateur, qui se compose d'un plateau *l* approprié au diamètre intérieur de la cuve, d'un axe *m* en bois creux sur lequel est montée une pièce en fonte portant un carré correspondant au carré *k*, et d'ailettes et tasseaux disposés radialement autour de l'axe *m*.

Prix du fascicule : 1 franc.

Le plateau *l* est constitué par des lamelles de bois disposées en croix, comme le montre bien le plan (fig. 4) pour éviter la dilatation que pourrait produire l'eau chaude; des espaces *o* sont ménagés entre ces lamelles pour faciliter la circulation de l'eau ou de la lessive; à sa périphérie, le plateau *l* porte un cercle de cuivre *p* de section demi-cylindrique qui en épouse la forme et supprime les arêtes des raccords des lamelles. C'est au centre du plateau *l* qu'est fixé l'axe en bois creux *m*, traversé par l'axe *i* et le tube *e*. A sa partie supérieure est montée très solidement, à l'aide de vis soulagées par des nervures pénétrant dans le bois, une pièce de fonte *q*, possédant un carré qui s'adapte exactement sur le carré *k* de l'axe *i*. Cette pièce en fonte est recouverte d'une enveloppe en cuivre *r*, une vis *s* solidarise le tout. Sur ces deux pièces principales, plateau *l* et axe *m*, sont montés à rainures et à vis des tasseaux et des ailettes *u* munies de trous pour la circulation de l'eau. Dans les différents assemblages de pièces en bois composant l'agitateur, on emploie des vis ou des chevilles en cuivre, pour éviter la rouille.

A la partie inférieure de l'axe *i* est goupillée une pièce en fonte *v* articulée en *x* après une fourche *y* réunie à une manivelle *z* à l'aide d'une bielle a^1. Les rapports des pièces *v*, *y*, *z* sont calculés de façon que chaque tour de manivelle *z* anime la pièce *v* et par conséquent l'axe *i*, d'un mouvement de va-et-vient égal à 1/3 de circonférence dans chaque sens. A chaque fin de course, la pièce *v* se trouve en contact avec des taquets à ressorts b^1, qui facilitent le retour sans choc.

Le mouvement initial est donné par le volant d^1 muni de la manivelle e^1, et transmis par deux pignons d'angle f^1, g^1 et l'arbre h^1 à la manivelle *z*. Un roulement à billes i^1 adoucit le frottement. Le tout est monté sur une pièce en fonte k^1 boulonnée sur la cuve.

Une tablette *l* mobile sert à égoutter le linge, à placer le savon, etc., tout en couvrant la cuve; un couvercle m^1 complète la fermeture.

Pour la marche au moteur, l'axe du volant est prolongé et muni de deux poulies; l'une n^1 est solidaire du volant, l'autre o^1 est folle.

Les dimensions de ces poulies sont telles qu'il est toujours possible d'actionner l'appareil soit à la main, soit au moteur, en enlevant la courroie ou la manivelle. Le débrayage se fixe sur le bout de l'axe par un prisonnier. c'est simplement une équerre munie d'une fourche et d'une manette.

RÉSUMÉ.

Cette invention concerne une laveuse perfectionnée pour le linge qui peut à volonté fonctionner à bras ou à moteur, et qui présente comme particularités distinctives essentielles :

1° La mise en mouvement de va-et-vient du plateau intérieur portant les batteurs au moyen d'une transmission par manivelle et bielle dans le but de donner à ce plateau une course dans chaque sens de 1/3 de circonférence par tour de l'arbre portant la manivelle.

2° Le dispositif amortissant les chocs et facilitant le changement de sens de marche à chaque fin de course, constitué par deux taquets à ressorts sur lesquels vient buter la manivelle montée sur l'arbre portant l'agitateur.

3° La commande de l'agitateur à bras ou au moteur par simple débrayage ou démontage de la manivelle d'un volant qui, par l'intermédiaire de deux pignons d'angle, d'un arbre vertical et d'une manivelle, transmet le mouvement à la bielle actionnant l'agitateur.

4° Le plateau intérieur constitué par des lamelles de bois croisées l'une sur l'autre, en combinaison avec des ailettes et des tasseaux, dans le but d'éviter le tassement du linge au fond de la cuve.

5° La commande de l'agitateur par le dessous de la cuve dans le but de rendre libre le dessus de cette cuve pour y placer des draps ou linges de grandes dimensions.

HENIN ET BOUGRAND.

Par procuration :

VERVEUIL & prime.

N° 363.514

MM. Henin et Bougrand

Pl. unique

Fig 1

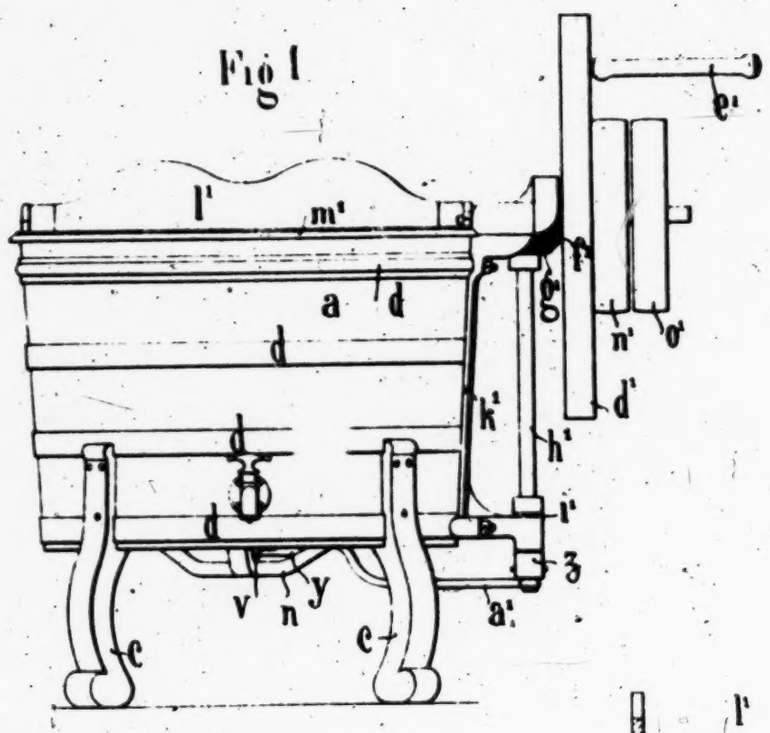


Fig 2

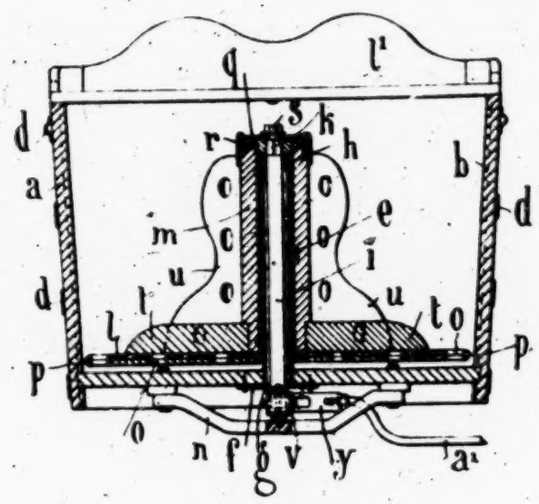


Fig.5

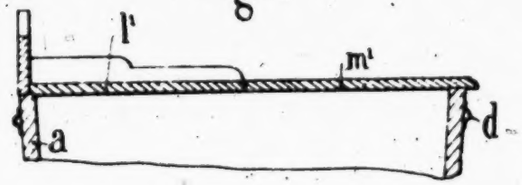


Fig.3

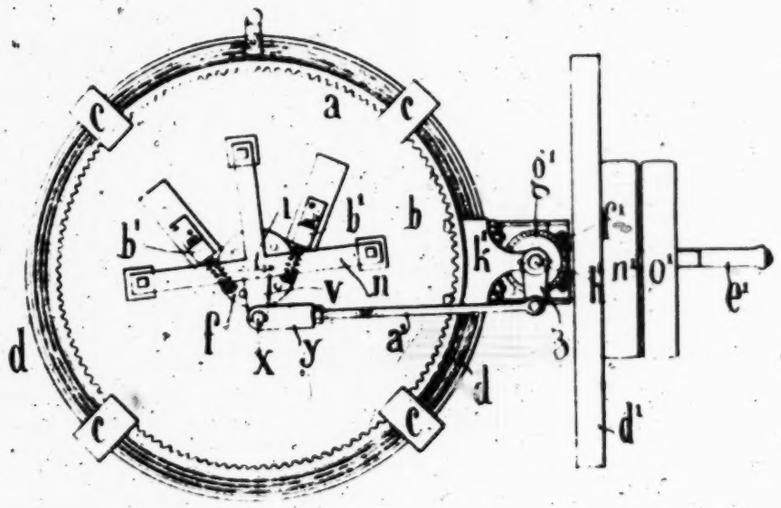
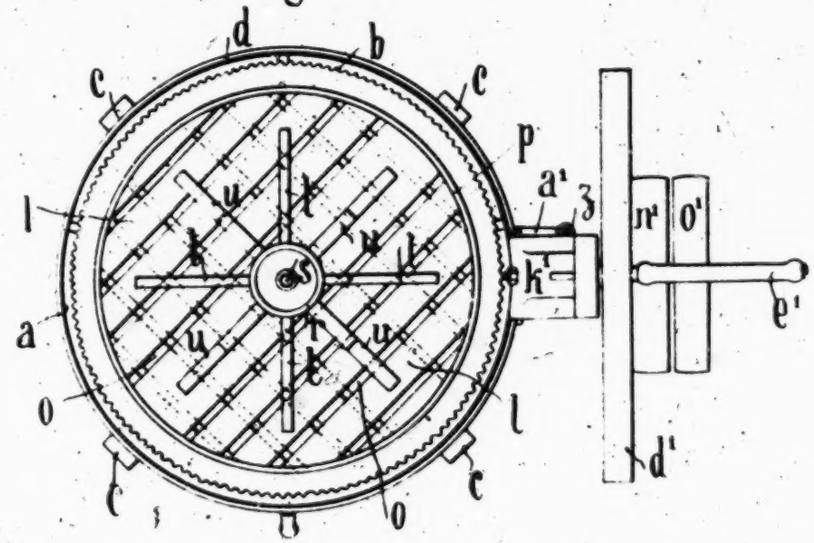


Fig.4



1379

Translation of
French Patent No. 363,514

XVI. Clothing Industries.

5. Ironing, cleaning and pleating.

Washing machine of the hand-operated or motor-driven type.

E. F. Henin and A. H. Bougrand, residing in France

Date of application: Feb. 20, 1906
Date of allowance: May 7, 1906
Date of publication: Aug. 2, 1906

This washing machine is designed so that the agitator which is vertically disposed in the tub is given an oscillatory motion by manually-operated or power-driven means, as may be required, operation of the washing machine by either of these two means being such that there is no necessity for dismounting any of the component parts since all that is needed is to operate a clutch when power is used or attach a handle when manual operation is contemplated.

The construction and operation of this washing machine will be readily understood by reference to the following description and the drawings attached thereto.

Fig. 1 is a side elevation of the washing machine. Fig. 2 is a cross-section through the tub, the power-transmitting means not being shown. Fig. 3 is a view of the washing machine seen from below. Fig. 4 is a plan view (with the cover removed) and Fig. 5 is a cross-section through the upper part of the tub, the drain board and the cover being illustrated.

1380 The machine comprises a tub a, made of hard wood, the interior of which is provided with riffles b, and which is supported by four legs c, which can be made of wood, iron, cast-iron, etc., and may be provided with lugs for securing the washing machine firmly to the floor. The staves which constitute the tub are held together by four steel bands d, the uppermost of which is ribbed for the purpose of preventing any warping of the tub under the action of the detergent composition. The joints of the staves and the bottom are joined together to ensure perfect tightness and preclude any possibility of dislocation. At its lower

part the tub carries a drain cock for drawing off the rinsing water or detergent solution after each run.

Extending upwardly into the tub through an opening in the center of the tub bottom is a copper tube e which carries at its lower end a flange f which is screwed to the outer surface of the tub bottom. This tube is intended to act as a guide for the shaft i which extends inside of the sleeve e; for this purpose tube e carries two bronze bushings, g, h, one at its lower end and the other at its upper end. It will likewise be seen that this sleeve has the advantage of preventing access of water to the shaft i. The latter, of machined steel, extends above the top of the sleeve e and terminates in a squared end k; its lower end acts as a center-pivot, bearing upon a three-armed bracket n screwed onto the bottom of the tub.

Mounted upon the squared end k of the shaft i is a member known as an agitator, which comprises a disc l conforming to the inner diameter of the tub, a hollow wooden
1381 shaft m upon which is mounted a cast-iron member with a square socket corresponding to squared end k and carrying vanes and ribs radially arranged around the shaft m.

The disc l is constructed of a plurality of crossed wooden slats (Fig. 4) for the purpose of preventing warping by the hot water; intervening spaces o are left between these slats for the purpose of facilitating the circulation of the water or of the detergent solution; on its periphery the disc l carries a copper ring p of semi-cylindrical cross-section which fits the contour of the slats snugly and covers the sharp edges of the ends of the slats. The hollow wooden shaft m is secured to the center of the disc l, with the shaft i and the outer sleeve e extending upwardly into the bore of the shaft m. Securely attached to the upper end of shaft m by means of screws and cooperating prongs extending into the wood is the cast-iron member q which carries a square-socketed bushing which fits exactly upon the squared end k of shaft i. This cast-iron member is covered by a copper jacket r, a screw s holding all these parts firmly together. Attached to these two principal members, viz., the disc l and the shaft m, by means of grooves and screws are the perforated ribs and vanes u for the circulation of the water. Copper screws or

nails are preferably employed for securing together the various elements which make up the agitator for the purpose of preventing rust. Attached to the lower part of the shaft i by means of a cotter pin is a cast-iron member v to which is pivoted at x a fork y which is connected to a crank z by means of the connecting rod a'. The relative lengths
1382 of the elements v, y, z are calculated in such a way that during each turn of the crank z there is imparted to the element v and hence also the shaft i, an oscillatory motion equal to one-third of a turn in each direction. At each end of the stroke the element v engages the spring controlled stops b' which act as shock absorbers.

The machine is started by rotating the fly wheel d' with the crank handle e', the rotary motion being transmitted by means of the two bevel gears f' and g' and the shaft h' to the crank z. A ball bearing i' minimizes friction. The entire drive mechanism is mounted upon a cast-iron bracket k' bolted to the tub.

A movable board l' serves as a drain for the wet linen or to hold the soap, etc., while at the same time it acts as a cover for the tub; a cover m' closes off the other part of the tub.

For the purpose of employing a power drive, the shaft of the fly wheel is extended and fitted with two pulleys, one of which, n', is secured to the fly wheel, the other o' is an idler.

The dimensions of these pulleys are such that it is always possible to actuate the machine either by hand or by power, by removing the belt or the crank handle, respectively. The belt shifting gear mechanism is attached to the end of the shaft by means of a stud bolt, being simply an angle bracket provided with a fork and lever.

Resumé

This invention relates to an improved laundry washing machine which can optionally be operated manually
1383 or driven by mechanical power, and which has the following characteristic features:

1. The putting into oscillatory motion of the inner plate carrying the beaters by means of a crank and a pitman for the purpose of giving this disc a stroke in each direction equal to one-third of a turn of the crank.

2. A shock absorbing device for facilitating the reversal of direction at each end of each stroke, said device comprising two spring-controlled stops engaged by the crank mounted upon the agitator shaft.

3. The actuation of the agitator by hand or by mechanical power by means of a belt-shifter or by a removable crank on the fly wheel which, through the intermediary of two bevel gears, a vertical shaft and a crank, transmits the motion to the pitman which actuates the agitator.

4. An interior disc comprising crossed wooden slats, in combination with wings and ribs, for the purpose of preventing the batch of linen from becoming packed at the bottom of the tub.

5. The arrangement of the means for imparting motion to the agitator, on the underside of the tub for the purpose of leaving free the upper part of said tub so as to permit of placing into the latter sheets and linen pieces of large dimensions.

HENIN & BOUGRAND
By power of attorney
Armengand Jeune.

1384 (Part of Defendant's Exhibit 13.)

(U. S. Letters Patent No. 83,145 to R. E. Ferguson, October 20, 1868.)

1084

R. E. Ferguson,

Washing Machine,

No. 83,145, Patented Oct. 20, 1868.

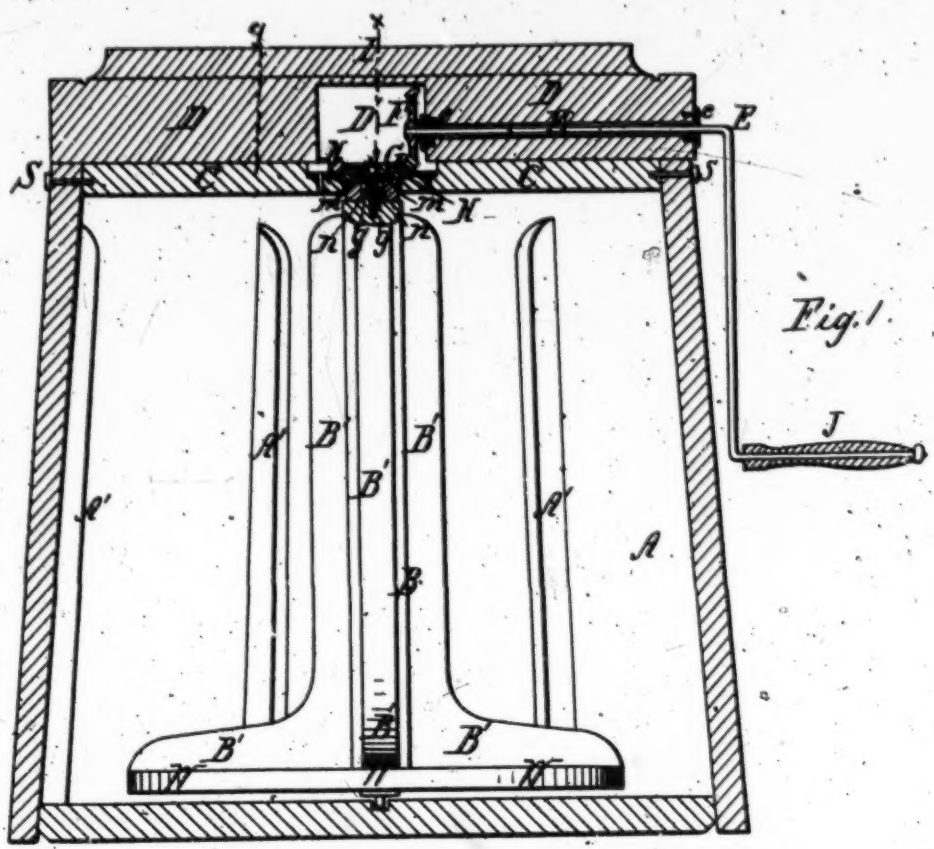


Fig. 1.

Fig. 2

Fig. 3

Fig. 4

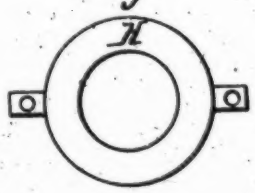


Fig. 5

Fig. 6

Witnesses
N. E. Marr-
W. Bruns.

Inventor
Robt. E. Ferguson

ROBERT E. FERGUSON, OF CHICAGO, ILLINOIS.

Letters Patent No. 83,145, *dated October* 20, 1868.

IMPROVED WASHING-MACHINE.

The Schedule referred to in these Letters Patent and making part of the same.

To all whom it may concern:

Be it known that I, ROBERT E. FERGUSON, of Chicago, in the county of Cook, and State of Illinois, have invented a new and useful Improvement in Washing-Machines; and I do hereby declare and make known that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, and the letters and figures marked thereon, which form part of this specification.

To enable those skilled in the art to understand how to construct and use my said improvement, I will proceed to describe the same with particularity, making reference, in so doing, to the aforesaid drawings, in which—

Figure 1 represents a central vertical section of my invention;

Figure 2 is a similar section, taken at the line *x* in fig. 1;

Figure 3 is a section taken at the line *y* in said fig. 1;

Figure 4 is a top view of the metallic head or cap on the vertical shaft of the washer;

Figure 5 is a plan view of the metallic journal-box in which said cap revolves; and

Figure 6 represents a bottom view of the bevelled-gear wheel, fixed upon the top of the said vertical shaft.

Similar letters of reference in the several figures denote the same parts of my said invention, which, however, relates simply to the upper part of the machine, or the attachment for operating the same, without reference to the lower parts.

My said invention consists in a novel arrangement or device, whereby the iron parts of the machine, or the shaft and gearing for operating the same, are entirely covered and protected from the suds or water in the machine, thus preserving them from rust and corrosion, and preventing the injury to the clothes which would be done by bringing them in contact with the rust of the parts, or from having the water infused with the rust while the washing is being done; the said casing or enclosure being at the same time so constructed and applied upon the machine as to constitute the journal-boxes or bearings for both the crank-shaft and the vertical washer-shaft, and also their gearing, so that by removing said protecting device from the machine, it being made readily removable for that purpose, the entire operating-parts of the washing-machine are therewith removed from the tub, as when it is desired to cleanse or wash out the same.

Another important advantage of the arrangement above specified of the casing and bearings of the shafts and their gearing, its position being central over the top of the tub, consists in the fact that thereby a rib or flange, upon which a wringer can be secured, can be arranged centrally over the tub, so that the water wrung or expressed from the clothes passing through the wringer will fall into the tub, instead of partially outside of the same, as is the case when the wringer is attached to the edge of the tub, or to a device secured upon the edge of the tub, as has heretofore been done.

A represents a vertical cylindrical tub, which is provided with a series of interior ribs A′, and has at the centre of the bottom a step or box, in which the lower end of the vertical shaft B rests, as shown, said shaft being provided with a circular horizontal disk W, near the bottom of the tub, and also with a series of vertical beaters B′, which agitate the water as the shaft B is revolved.

Upon the top of said shaft B, which rises to the under side of a wooden cross-piece, C, which is secured at the top of the tub by screws S S, as shown, is formed a rectangular nib or projection, which fits into a rectangular hole *n* in the iron cap L, so as to fix said cap firmly to the shaft B.

The said cap L has a circular riser marked *m*, which fits into a metallic collar, H, secured in a recess upon said cross-bar C, as shown, said collar resting upon the cap L, so as to keep the shaft B in place, while the said circular riser or journal *m* turns freely in the metallic box or collar H.

The cap L passes up in a circular opening in the under side of the cross-bar C, just large enough to receive said cap, and is almost wholly concealed in the bar C, but this cap is made of galvanized iron, so that although its lower side is exposed to the water, no bad results can follow, as the said exposed surface of the cap will not rust.

G represents a bevelled-gear wheel, provided with a rectangular nib, *g*, which fits into the corresponding hole *n* in the cap L, and said wheel G and cap L are firmly and rigidly secured to the top of the shaft B by means of a screw, *s*, passing down through them and into said shaft, as shown in the drawings.

D represents a bar of wood, of a circular form, having a flat lower face, which lies close down upon the top of the cross-bar C, said bar being provided with flanges *d*, as shown in fig. 3, which fit down upon each side of said cross-bar C, to keep it in place upon said bar, and prevent the water from spattering in upon the gearing through the space or crack between the parts C and D.

At the middle point of the bar D is formed a chamber, D′, in the lower part of which the aforesaid gear-wheel G lies, and upon one side of which a vertical gear-wheel, bevelled so as to engage with G, marked F, is supported upon a shaft, E, which passes through from one end of the said bar D, as shown, suitable journal-boxes *e e* being arranged, in which the shaft E may be revolved by turning the crank-handle J.

Thus the turning of the handle J will cause the washer-shaft B to revolve as desired, while all the gearing and metal parts are secluded and preserved from contact with the water while the machine is in operation, as hereinbefore mentioned.

The parts C D are firmly secured together by screws or otherwise, and the whole properly secured to the tub by means of screws S S, as aforesaid.

By taking the screws or fasteners, which secure the pieces C D together out, the part D, with its shaft and wheel F can be removed, when, by taking the screw *s* from the top of the shaft B, the wheel G can be removed, so as to permit the cross-bar C to be removed independent of the washer-shaft and its attachment.

Upon the top of the coverer D is arranged a rib or flange, I, whereunto any wringer can be secured, for the purpose of wringing the clothes, the protecting-cover D C preventing the water from corroding the metal of the gearing and other parts of the device, which rib or flange I, from its being secured centrally over the tub, causes the water from the wringer to fall into the tub, which central position of the rib could not be attained except for the employment of the covering-bar C D, which sustains the rib, and at the same time protects the gearing and shaft E from the water expressed from the wringer.

Having described the construction and operation of my invention, I will now specify what I claim, and desire to secure by Letters Patent.

I claim the arrangement of the wringer-rib I centrally over the tub of the machine, when supported upon a bar or bars C D, which at the same time encloses and protects the gearing of the machine from the water expressed from the clothes by the wringer, all constructed and operating as and for the purposes specified.

ROBT. E. FERGUSON.

Witnesses:
W. E. MARRS,
H. BRUNS.

1387 (Part of Defendant's Exhibit 13.)

(U. S. Letters Patent No. 88,478 to C. W. Hermance, March 30, 1869.)

1088

C. W. Hermance.

Wash Boiler.

No. 88,478 Patented Mar. 30, 1869.

Fig. 1.

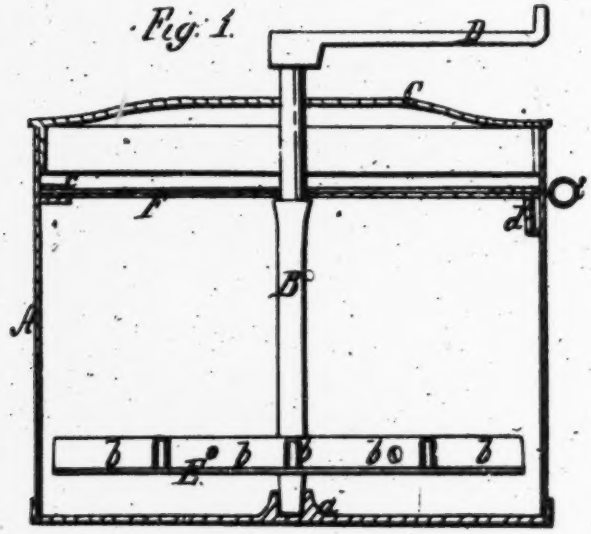
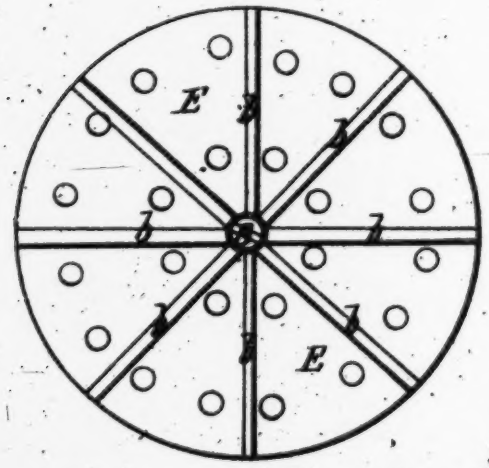


Fig. 2.



Witnesses;
Cornelius Cox
John M. Stoots

Inventor;
C. W. Hermance
per
Alexander Wilson
Atty.

UNITED STATES PATENT OFFICE.

C. W. HERMANCE, OF SCHUYLERVILLE, NEW YORK.

IMPROVED WASHING-MACHINE.

Specification forming part of Letters Patent No. **88,478**, dated March 30, 1869.

To all whom it may concern:

Be it known that I, C. W. HERMANCE, of Schuylerville, in the county of Saratoga, and in the State of New York, have invented a new and useful Improvement in Wash-Boilers; and do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, and to the letters of reference marked thereon.

The nature of my invention consists in the construction and general arrangement of a "wash-boiler," with a vibrating metallic wheel, on which the clothes are placed.

In order to enable others skilled in the art to which my invention appertains to make and use the same, I will now proceed to describe its construction and operation, referring to the annexed drawings, which form a part of this specification, and in which—

Figure 1 is a vertical section, and Fig. 2 a plan view.

A represents a wash-boiler of any dimensions desired, having in the center of its bottom a socket, *a*, or its equivalent, for the insertion of the lower end of the vertical shaft B, which passes upward through a hole in the lid C, and is at its upper end provided with a crank, D, for the purpose of turning or rotating said shaft.

On the shaft B, near its lower edge, is placed a wheel, E, of circular form, said wheel being made of tin, galvanized iron, or other suitable metallic substance, and perforated, as shown in Fig. 2. This wheel is on its upper side provided with a series of cleats or ribs, *b b*, radiating from the center to the outer periphery of the wheel. These cleats or ribs are also formed of metal, and bent over so as to form a channel or a hollow flattened tube, the inner end being closed and the outer open. Through each of the cleats or ribs *b b* are one or more holes, as seen in Fig. 1.

Across the boiler A, near its top, is placed a cross-bar, F, through the center of which the vertical shaft B passes, the said cross-bar forming the bearing for the shaft. One end of said cross-bar is inserted in a socket, *c*, on the inside of the boiler, and the other end, being bent downward, is inserted in a loop, *d*, on the other side, inside of the boiler. A pin, E, is then inserted from the outside of the boiler on top of the end of the cross-bar, or into a loop on the same, thus holding the cross-bar firmly in its place.

The clothes to be washed are laid on the cleats or ribs *b b* on the wheel E, said ribs holding the clothes up from the wheel, thus preventing them from clogging up the holes or perforations in the wheel, but allowing at all times a free passage of the water through the same.

The operation of my machine is very simple. The operator, by the use of the crank D, turns the wheel E, say, about one-half around, then back again, and so on rapidly from side to side, causing a vibrating or reciprocating motion of the wheel. This produces a tremendous agitation of the suds as the shaft B carries not only the wheel E, but also the water and clothes, with it. This agitation is further increased by the peculiar construction of the cleats or ribs *b b*. These cleats being hollow, the water is thrown outward by the centrifugal force, and then rushes in again through the open outer ends and perforations.

The wheel E being made of metal, it will not be affected by the action of boiling water, and it cannot shrink or swell, which is always the case with a wooden wheel.

I am aware that machines have been constructed for washing clothes by the friction of a disk with radial ribs attached to a vertical shaft; these, therefore, I do not claim; nor do I claim constructing a wash-machine of metal, as this also has been done.

Having thus fully described my invention, what I claim as new, and desire to secure by Letters Patent, is—

The arrangement of the thin perforated metal disk E, with its radial hollow tubes *b b*, open at their outer ends and perforated, all attached to the vertical shaft B, passing through the movable bar F and within the wash-boiler A, as shown and described.

In testimony that I claim the foregoing I have hereunto set my hand this 26th day of February, 1869.

C. W. HERMANCE.

Witnesses:
J. H. D. KIDDER,
G. F. WATSON.

1389 (Part of Defendant's Exhibit 13.)

(U. S. Letters Patent No. 113,762 to J. W. Groat, April 18, 1871.)

1092

J. W. Groat,

2 Sheets Sheet 1.

Washing Mach.

No. 113,782. Patented Apr. 18. 1871.

Fig. 1

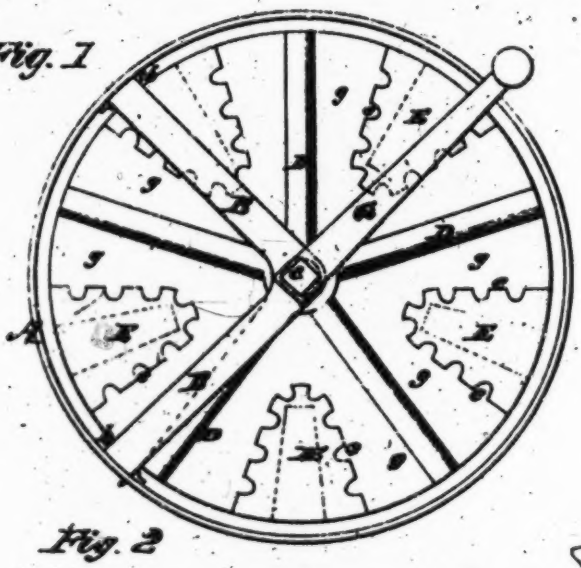


Fig. 2

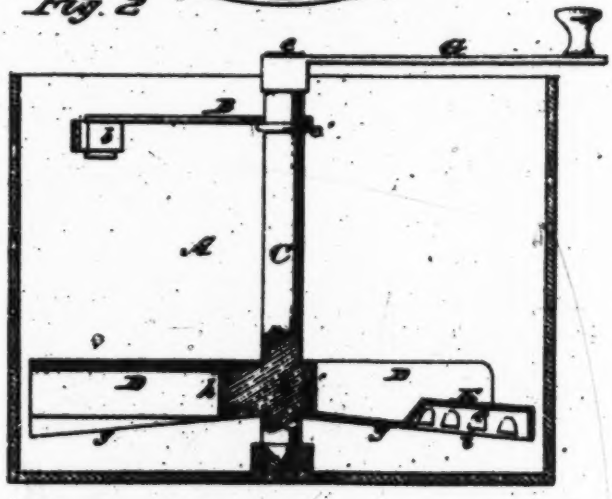
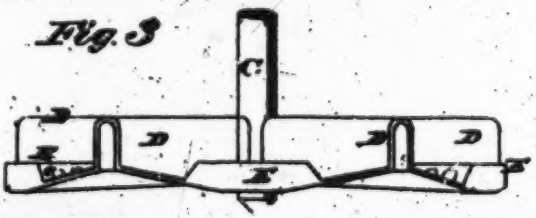


Fig. 3



Witnesses.
R. T. Campbell.
J. W. Campbell.

Inventor
J. W. Groat
by
Mason, Fenwick & Lawrence

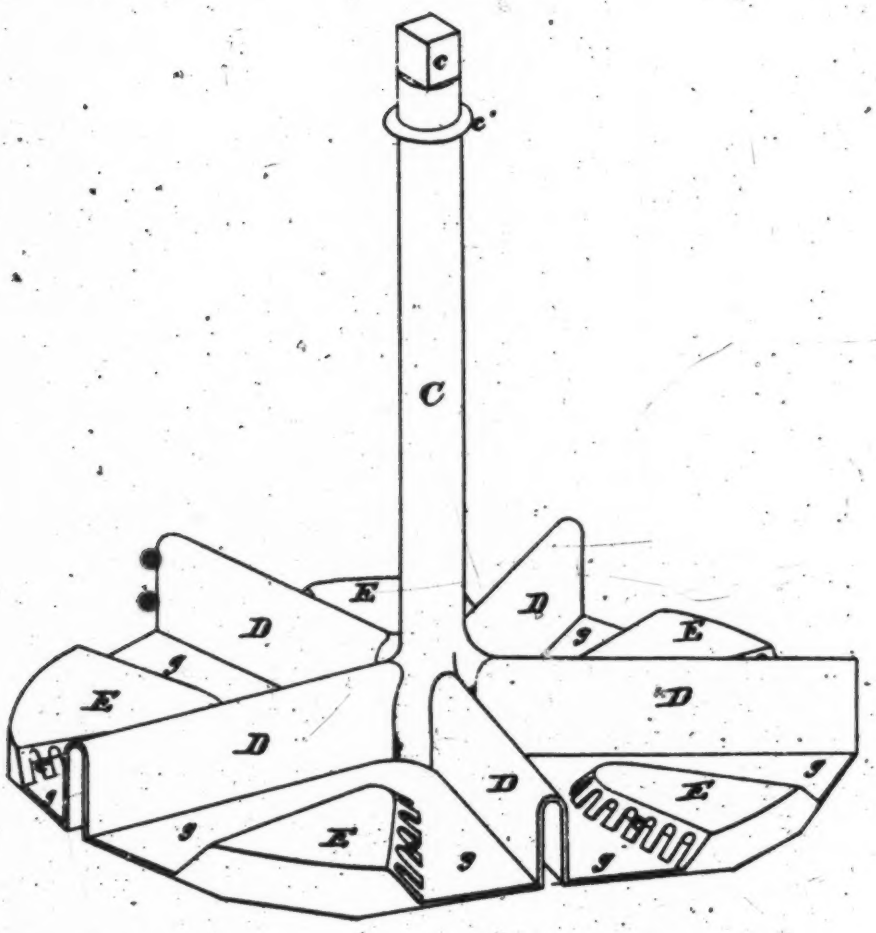
1094

2. Sheets. Sheet. 2.

J. W. Groat,

Washing Mach.

No. 113,762. Patented Apr. 18. 1871.



Witnesses.
P. T. Campbell
J. N. Campbell.

Inventor
J. W. Groat
by
Munn, Scudder & Lawrence.

United States Patent Office.

JULIUS W. GROAT, OF FREMONT, OHIO.

Letters Patent No. 113,762, dated April 18, 1871.

IMPROVEMENT IN WASHING-MACHINES.

The Schedule referred to in these Letters Patent and making part of the same.

To all whom it may concern:

Be it known that I, JULIUS W. GROAT, of Fremont, in the county of Sandusky and State of Ohio, have invented a new and improved Washing-Machine; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawing making part of this specification, in which—

Figure 1, plate 1, is a top view of the machine complete.

Figure 2, plate 1, is a diametrical section through the machine.

Figure 3, plate 1, is an edge view of the rotary washing-wheel.

Figure 4, plate 2, is a perspective view of the washing-wheel and its shaft.

Similar letters of reference indicate corresponding parts in the several figures.

This invention relates to improvements on washing-machines which have horizontal ribbed or flange-wheels arranged in the bottoms of the vessels which contain the articles while being cleansed.

The washing is performed with such machines by the revolution of their wheels and the rubbing of the ribs and the dashing of the water against the articles.

The nature of my invention consists—

First, in a washing-wheel which is applied to a vertical shaft, and which is composed of radial arched arms open at the bottom, and connected together by double inclined webs or feathers which have openings through them for allowing water to be dashed upward through the wheel against the articles being cleansed.

Second, in the combination of raised covers or guards having grated or perforated sides with the perforated inclined webs between the radial arms, as will be hereinafter explained.

To enable others skilled in the art to understand my invention, I will describe its construction and operation.

In the accompanying drawing—

A represents a wash-boiler, which may be made of any desired capacity and suitably strengthened.

This boiler is cylindrical, and in the center of its bottom is a raised step, *s*, for receiving the conical end of a vertical shaft, C.

Near the upper end of the boiler A, and fastened to it inside, are two flat staples, *b b*, which receive the bent ends of a horizontal triangular support, B, which sustains the shaft C near its upper end, and, by means of an annular rib, *c'*, on this shaft, keeps it down in place while the machine is in operation.

The triangle B is removable, and is slipped out of its staples *b b* when it is desired to remove the shaft C and its wheel.

The upper end *c* of shaft C is prismatic, and receives the end of a handle, G, by which the shaft is rotated or oscillated.

On the shaft C is formed a hub, *h*, from which radiate arms *h' h'*, corresponding in number to the number of arched ribs which are formed on the washing-wheel.

The upper surfaces of the arms *h'* are rounded, to correspond to the rounded or arched form of the ribs on said wheel.

The washing is executed by means of a wheel of peculiar construction, which is preferably made of metal, galvanized to prevent rust, and which is secured, by its hollow radial arched ribs D to the radial arms *h'* of the hub *h* on the vertical shaft C.

The attachments of the wheel to its arms *h'* may be effected by means of rivets or solder, or by both combined.

The wheel consists of a number of raised radial arches, ribs, or beaters, D, having open bottoms and closed arched tops, and rising from webs *g*, which are respectively inclined in opposite directions, and perforated at *i* (see fig. 2) for the free escape of water from below above the webs, where it will be acted by the ribs D and dashed among the clothes.

The openings *i* are in the middle of the spaces between the ribs D, and the webs incline in two directions toward each opening.

To prevent the articles which are being washed from passing through or closing the openings *i*, I arrange a guard, E, over each one of these openings, the sides *e* of which guard are inclined or perforated to allow a free circulation of water through the openings.

It will be seen from the above description, when taken in connection with the annexed drawing, that, when articles to be cleansed are put into the boiler or vessel A upon the wheel, with soap and water, and the wheel is turned back and forth about its axis, the inclined webs *g* will cause water below the wheel to dash up through the openings *i*, where the currents will be struck by the ribs D and dashed against and through the articles; at the same time the ribs D will operate to rub and turn the articles and agitate the water violently above the wheel.

Not only do I obtain an advantage by my improved construction of washing-wheel over others for the same purpose in its operation upon the articles being washed and the agitation of the water in the vessel, but I also obtain an advantage in the con-

struction of the wheel, in that it is very light and very strong and durable, and can be readily manufactured out of sheet metal at a small cost.

Having described my invention,

What I claim as new, and desire to secure by Letters Patent, is—

1. The washing-wheel, constructed with radial arched open-bottom ribs or beaters D and inclined perforated webs *g*, substantially as described.

2. The covers or guards E, having perforated sides *e*, and applied over openings *i i* between the radial ribs or beaters D, substantially as and for the purposes described.

JULIUS W. GROAT.

Witnesses:
J. R. BARTLETT,
FRANK BRAYTON.

1393 (Part of Defendant's Exhibit 13.)

(U. S. Letters Patent No. 1,118,210 to F. A. & S. W. Mills, November 24, 1914.)

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1098

F. A. & S. W. MILLS.

GEARING.

APPLICATION FILED JAN. 2, 1913.

1,118,210.

Patented Nov. 24, 1914.

5 SHEETS—SHEET 1.

Fig. IX.

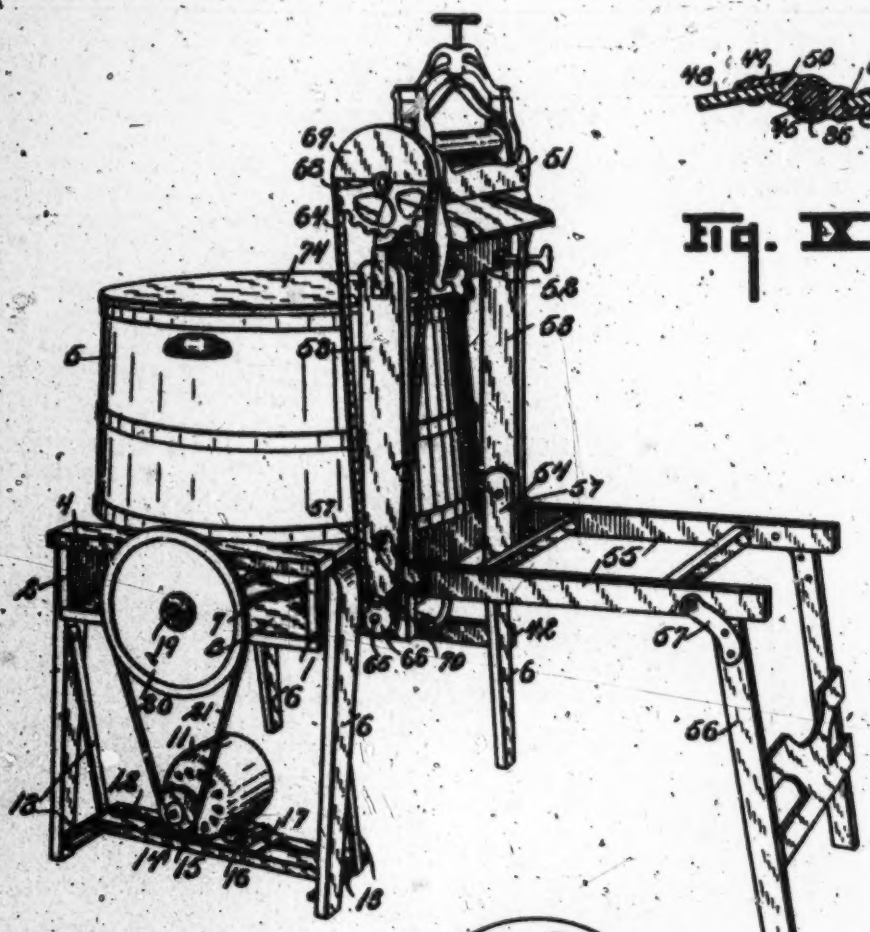

Fig. I.

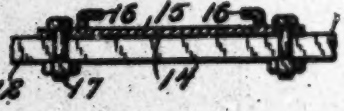

Fig. VIII.

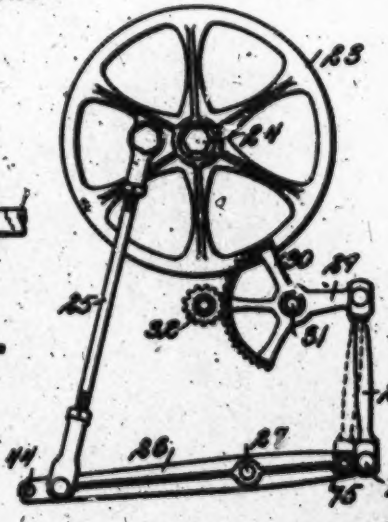

Fig. VII.

Witnesses
M. A. Woodruff
L. G. Greenfield

Inventors
Fred A. Mills
and Saw W. Mills
By Chappell & Earl
Attorneys

8901

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F. A. & S. W. MILLS.

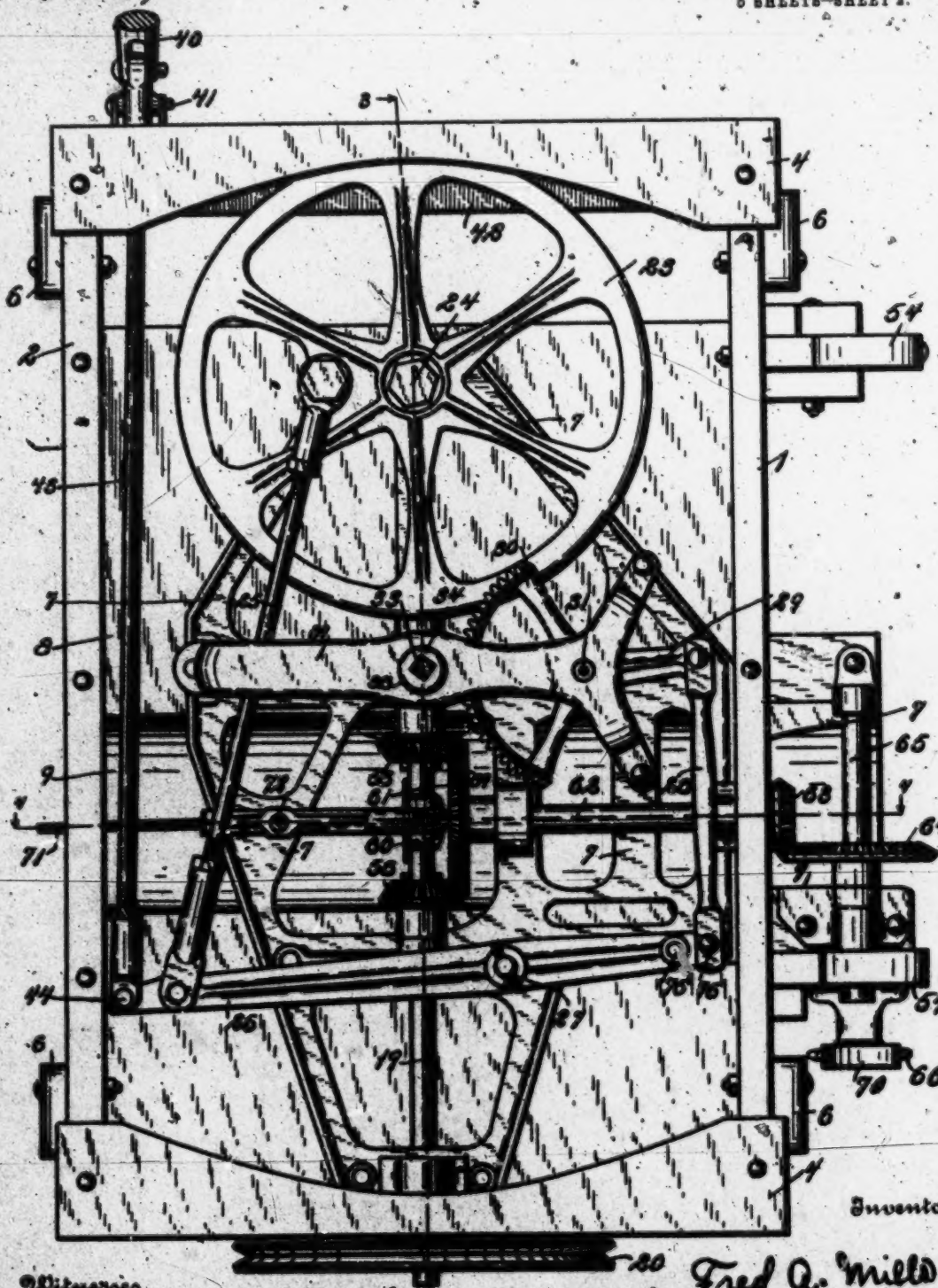
GEARING.

APPLICATION FILED JAN. 2, 1913.

1,118,210.

Patented Nov. 24, 1914.

5 SHEETS—SHEET 2.



Witnesses
M. F. Woodruff.
L. G. Greenfield.

Fig. II.

Inventors
Fred A. Mills
and Sam W. Mills
By Chappell Earl
Attorneys

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F. A. & S. W. MILLS.

GEARING.

APPLICATION FILED JAN. 2, 1913.

1,118,210.

Patented Nov. 24, 1914.

3 SHEETS—SHEET 3.

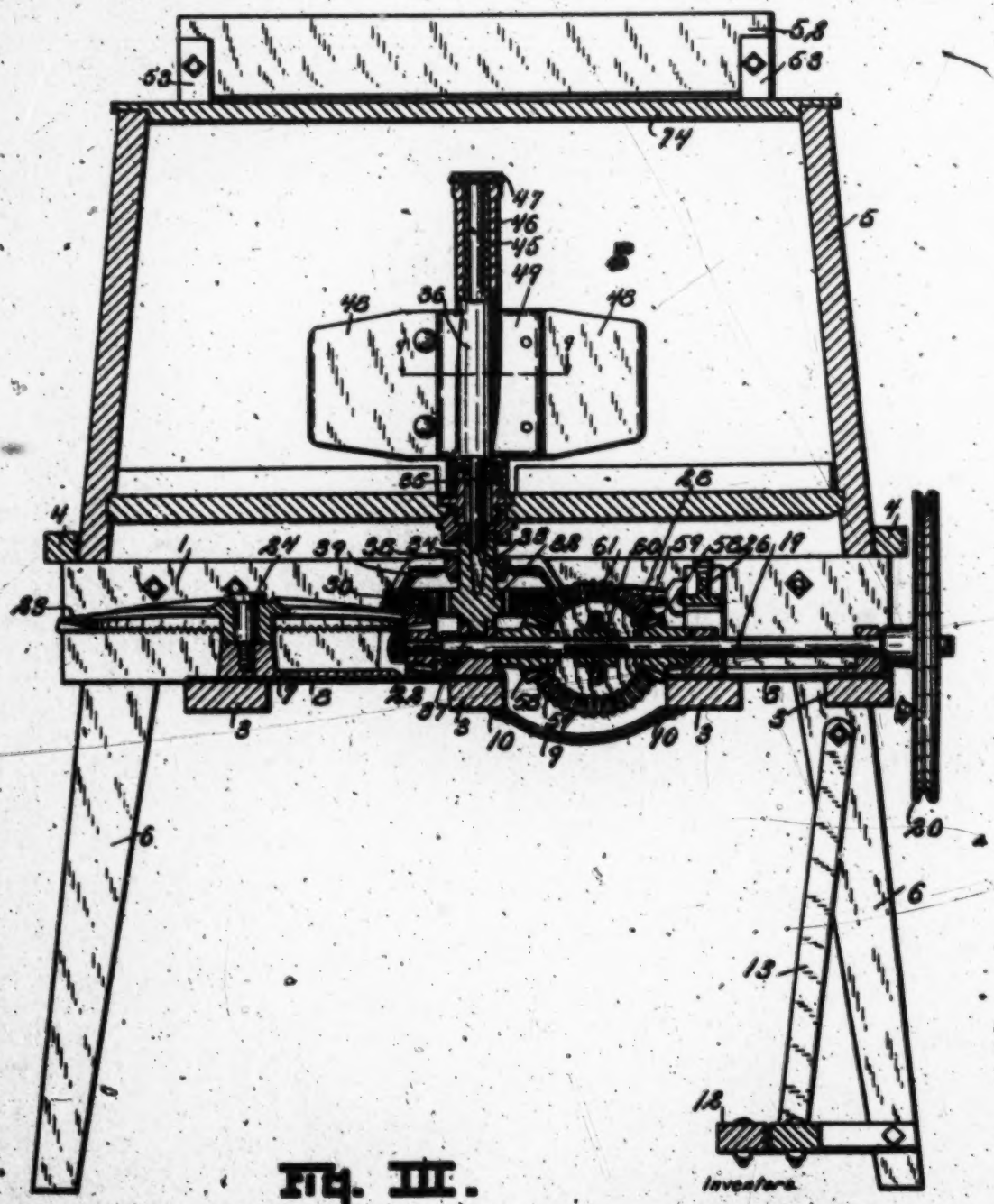


Fig. III.

Witnesses
M. P. Woodruff
L. G. Greenfield

Inventors
Fred R. Mills
and Sam W. Mills
By Chappell & Earl
Attorneys

1104

F. A. & S. W. MILLS.

GEARING.

APPLICATION FILED JAN. 8, 1913.

1,118,210.

Patented Nov. 24, 1914.

5 SHEETS—SHEET 4.

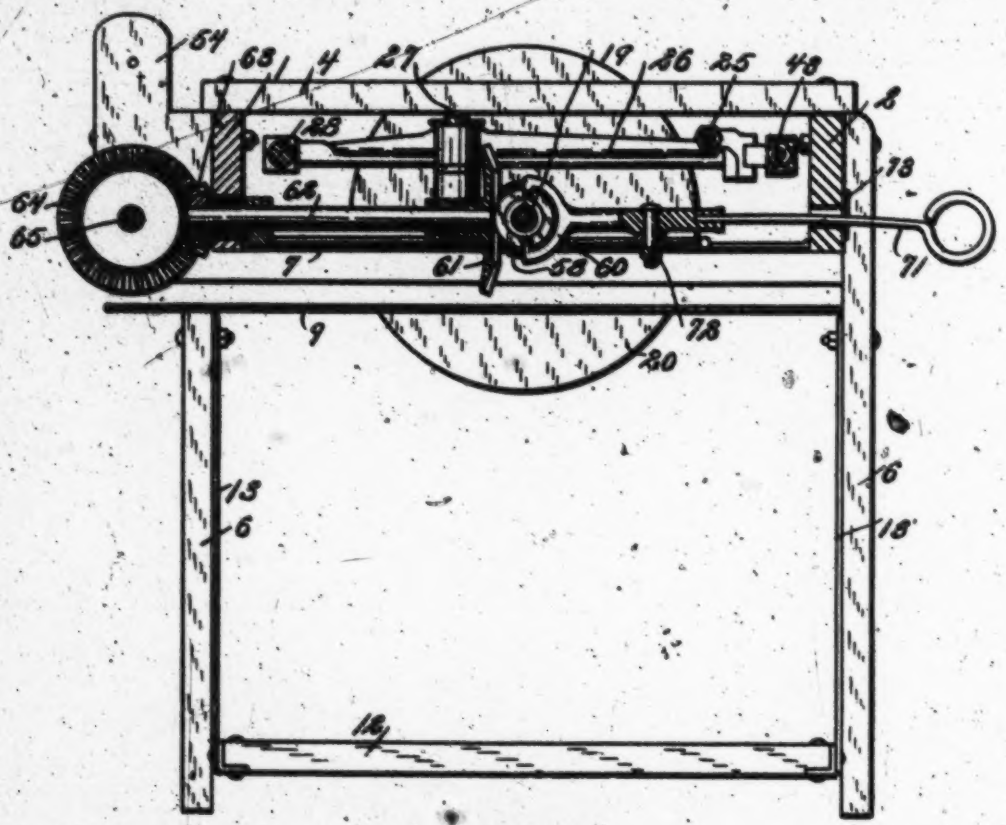


Fig. IV.

Fig. V.

Fig. VI.

Witnesses
M. P. Woodruff
L. G. Greenfield

Inventors
Fred A. Mills
and Sam W. Mills
By Chappell Hart
Attorneys

1106

F. A. & S. W. MILLS.

GEARING.

APPLICATION FILED JAN. 2, 1913.

1,118,210.

Patented Nov. 24, 1914.

5 SHEETS—SHEET 5.

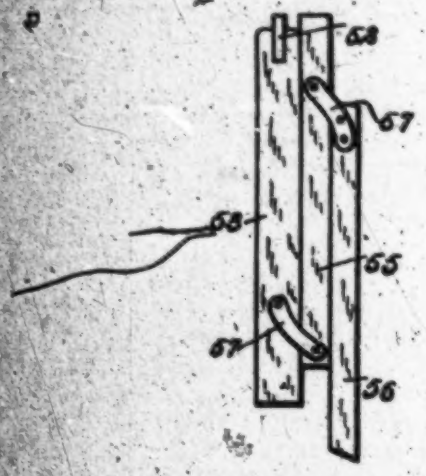


Fig. XI.

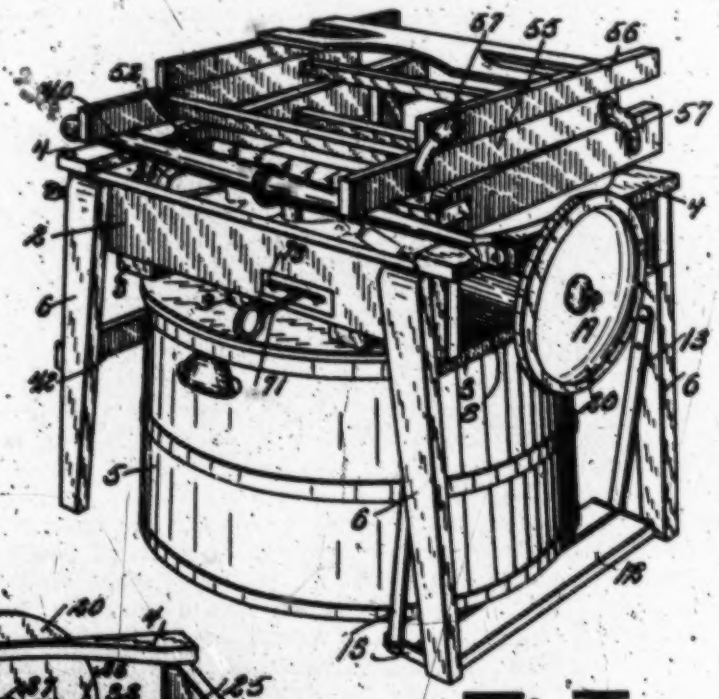


Fig. X.

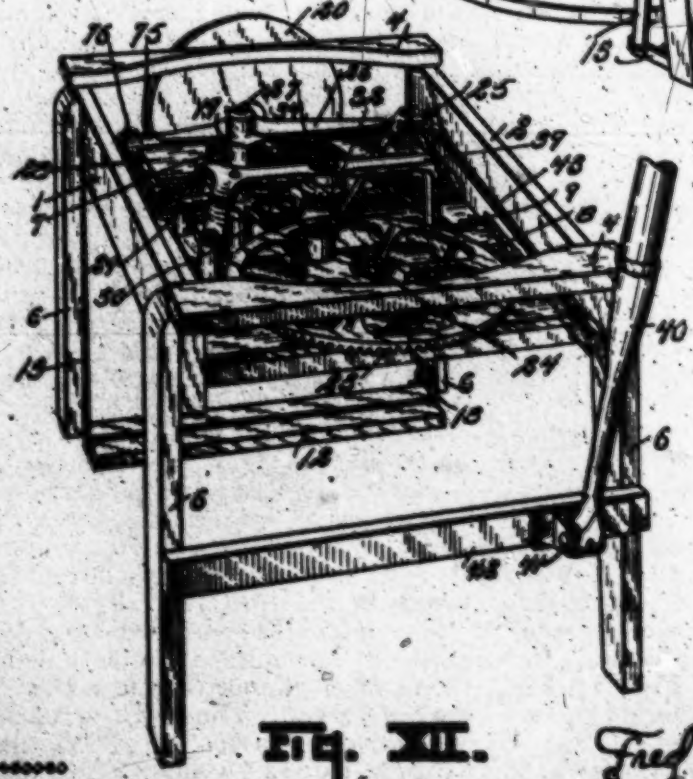


Fig. XII.

Witnesses
M. A. Woodruff
L. G. Greenfield

Inventors
Fred A. Mills
and Sam W. Mills
By Chaffell & Earl
Attorneys

UNITED STATES PATENT OFFICE.

FRED A. MILLS AND SAM W. MILLS, OF KALAMAZOO, MICHIGAN.

GEARING.

1,118,210. Specification of Letters Patent. Patented Nov. 24, 1914.

Application filed January 2, 1913. Serial No. 739,746.

To all whom it may concern:

Be it known that we, FRED A. MILLS and SAM W. MILLS, citizens of the United States, residing at Kalamazoo, Michigan, have invented certain new and useful Improvements in Gearing, of which the following is a specification.

This invention relates to improvements in gearing for washing machines.

The main objects of this invention are: First, to provide an improved gearing well adapted for use in washing machines. Second, to provide an improved gearing well adapted as a driving mechanism for washing machines which is adapted for either motor or for manual power. Third, to provide an improved washing machine in which the tub may be readily removed or replaced and the agitator readily connected to or disconnected from the driving mechanism. Fourth, to provide an improved washing machine embodying these advantages, which is easily collapsed for transportation or storage, and one which may be packed in a very compact package and readily set up for use by an inexperienced person.

Further objects, and objects relating to structural details, will definitely appear from the detailed description to follow.

We accomplish the objects of our invention by the devices and means described in the following specification. The invention is clearly defined and pointed out in the claims.

A structure which is a preferred embodiment of our invention is clearly illlustrated in the accompanying drawing forming a part of this specification, in which:

Figure I is a perspective view of a structure embodying the features of our invention. Fig. II is a plan view of the driving mechanism and supporting frame therefor. Fig. III is a detail vertical section on a line corresponding to line 3—3 of Fig. II. Fig. IV is a detail vertical section on a line corresponding to line 4—4 of Fig. II. Fig. V is a detail perspective of one of the gears 58 through which the wringer is driven. Fig. VI is a detail perspective view of the clutch collar 60. Fig. VII is a plan view of a part of the driving mechanism removed from the frame. Fig. VIII is a detail perspective view of the motor supporting plate 14. Fig. IX is a horizontal section through the agitator, on a line corresponding to line 9—9 of Fig. III. Fig. X is a perspective view of the structure collapsed for storage or transportation. Fig. XI is a detail side elevation showing the auxiliary stand collapsed against the wringer standard. Fig. XII is a perspective view of a modified form of the driving mechanism, the wringer driving mechanism shown in the other views being omitted.

In the drawing similar reference characters refer to similar parts throughout the several views, and the sectional views are taken looking in the direction of the little arrows at the ends of the section lines.

Referring to the drawing, we provide a main frame consisting, in the structure illustrated, of front and rear sills 1 and 2 respectively, and cross sills or pieces 3 and 4, the cross pieces 3 being arranged on the under side of the front and rear sills and the cross pieces 4 being arranged on top of the same and curved on their inner edges to receive the tub 5 which is adapted to rest on the sills 1 and 2. The legs 6 are secured to the sills 1 and 2.

The driving mechanism is supported on a suitable skeleton frame 7 disposed horizontally on the cross pieces 3 between the sills 1 and 2. The frame 7 is a casting and is provided with suitable bearings and pivot studs for the driving mechanism. Below the frame 7 are plates or trays 8 and 9 which serve to collect any oil or the like dripping from the bearings. The tray 9 is arranged on the under sides of the intermediate cross pieces 3 in order to accommodate certain of the gears, as clearly shown in Fig. III. This tray 9 is removably supported by slides 10 secured to the under sides of the cross pieces 3.

The motor 11, an electric motor being shown in conventional form, is mounted on the shelf 12 supported under the frame by the brackets 13. The motor is supported by base plate 14 having a seat 15 with overhanging flanges 16 adapted to receive the base of the motor. The base plate is adjustably secured to the shelf by means of the bolts 17 engaging the longitudinal slot 18 in the shelf. The belt 21 may be tightened by adjusting the plate 14 on the shelf.

The driving shaft 19 is provided with a belt wheel 20 for the motor belt 21. The

driving shaft 19 is supported in suitable bearings on the frame 7. On the inner end of the driving shaft 19 is a beveled gear 22 meshing with a gear on the horizontally disposed crank wheel 23 which is supported on the stud bearing 24 on the frame 7. The gear 23 is connected by the connecting rod 25 to the lever 26 pivoted on the stud 27 on the frame 7. The lever is connected by the link 28 to the arm 29 of the segment 30. The segment 30 is journaled on the stub shaft 31. The segment 30 meshes with the agitator gear 32 having a socket 33 in its hub 34 adapted to receive the spindle 35 of the agitator 36. The pinion 32 is supported in a horizontal position, by a socket-like bearing 37, its upper end being supported by a bearing 38 in the spider 39 mounted on the frame 7. The spider 38 also is provided with a bearing for the shaft 31 of the segment 30. With thus the parts arranged, the agitator gear 32 is driven with an oscillating movement and the power is multiplied so that but little motor power is required to operate the machine.

The driving mechanism is compactly arranged and disposed within the main frame between the front and rear sills. The driving shaft 19 is horizontally disposed and the crank wheel 23 is horizontally disposed at the inner end of the driving shaft. The lever 20 is arranged transversely of the frame and driving shaft, it being located above the shaft. The segment 30 is disposed between the crank wheel and the lever, while the agitator gear 32 is centrally disposed above the driving shaft between the crank wheel and lever. The connecting rod 25 is on one side of the driving shaft, while the link 28 is on the other. The hand lever and its connections and the wringer connections are also arranged with a view of economizing space.

The hand lever 40 is pivoted at 41 on the cross piece 42 at one end of the frame and is connected by the link 43 to the lever 26. Ordinarily when driven by a motor, the hand lever is removed. To do this it is only necessary to remove its pivot 41 and the pivot 44 for the link to the lever. It may, of course, be left upon the machine while the machine is driven by the motor as it merely swings back and forth.

On the bottom of the tub we mount a tube 45. The sleeve-like hub 46 of the agitator 36 fits over this tube while the agitator spindle 35 extends through the same into engagement with the agitator gear 32. The spindle is secured to the upper end of the sleeve by means of the pin 47 and projects through the bottom of the tub to engage the socket in the agitator gear 32 as stated. The agitator is not connected in any way to the tube 45. The agitator is supported by the spindle which rests in the socket as stated. The tube projecting up within the agitator sleeve prevents the water escaping from the tub.

The agitator blades 48 are secured to flanges 49 having seats 50 for the inner ends of the blades, the flanges being formed integrally with the sleeve 46. See Fig. IX. This forms a simple but satisfactory structure, for the agitator, and its blades which are preferably of wood, are supported so that they are not likely to split or warp.

The wringer 51 is mounted on the cross piece 52 of the wringer supporting frame by means of suitable clamps. The wringer supporting frame consists of suitable uprights or standards 53 connected at their upper ends by the cross piece 52. The uprights or standards 53 are pivotally mounted on the upwardly projecting brackets 54 on the rear frame piece 2 so as to collapse forwardly upon the main frame when the tub is removed. See Fig. X.

The auxiliary tub bench or stand is pivotally connected to the uprights 53 by straps 57 to collapse against the wringer support, as shown in Figs. X and XI. The legs 56 for the tub bench 55 are pivotally supported by straps 57 so as to collapse, as shown.

The ends of the horizontal or sill members of the bench 55 abut the edges of the uprights 53 when the stand is extended. When collapsed, the stand 55 is raised up and swung on the pivots connecting the same to the straps 57 so that its sill members lie edge to edge with the uprights 53—see Fig. XI—and is supported in this position without additional securing or attaching means. The wringer standard may be collapsed upon the main frame without removing the wringer.

To drive the wringer in either direction, we mount a pair of beveled gears 58 on the driving shaft 19, the gears being rotatably mounted on the shaft. These gears are provided with clutch jaws 59, while the clutch collar 60 is splined to the driving shaft 19 and adapted to be shifted into engagement with either of the gears 58 or to a neutral position, as shown in Fig. II.

Arranged in mesh with both of the gears 58 is a gear 61 mounted upon the end of the driven shaft 62 which is supported in suitable bearings on the gearing frame 7. The outer end of the shaft 62 is provided with a bevel gear 63 meshing with a gear 64 on the shaft 65. The shaft 65 is supported on the ends of the intermediate cross pieces 3 and on arms on the frame 7 which keeps all the parts of the driving mechanism in proper alinement. The shaft 65 is provided with a sprocket 66 connected by the sprocket chain 67 to the sprocket 68 of the wringer. The sprocket 68 is provided with a housing 69 while the sprocket 54 is provided with a gear 70. The clutch collar 60

is shifted by the lever 71 which is mounted on the pivot 72 on the frame 7. The lever projects through a keeper plate 73 on the front sill 1. The keeper plate is suitably notched to hold the lever in its adjusted positions. With these driving connections, the wringer may be driven in either direction so that in use, the articles may be wrung from the washing tub into a rinsing tub on the bench 55 and the wringer reversed and the articles wrung from the rinsing tub and delivered onto the cover 74 of the tub 5 which is adapted to receive the same. This may be done while the second batch of laundry is being washed.

The structure is easily knocked down for storage or transportation as the tub can be lifted off either before or after the agitator is removed although, in practice, it is preferable that the agitator be taken out of the tub before the tub is lifted from the stand.

The wringer is of the ordinary clamp type and can be readily removed from its standard when the stand or bench 55 may be collapsed against the standard and the standard collapsed forwardly onto the main frame, as shown in Fig. X.

When the structure is packed for transportation or storage, the tub 5 may be slipped under the main frame after the motor has been removed. The motor is preferably separately crated as that should be fully protected. By placing the tub under the frame as shown in Fig. X, the frame serves as part of the packing crate and but little additional crating is required. The structure collapsed as illustrated, is very compact.

In the modification shown in Fig. XI, the wringer and driving mechanism therefor is omitted.

To change the stroke of the agitator, we provide the lever 26 with a plurality of holes 75 for the connecting pivot 76 of the link 28 thereto.

The tray or pan 9 is removed when the structure is packed for shipment, as shown in Fig. X.

Our improved washing machine is very simple and easy to operate, as it is only necessary in setting it up to place the tub on the frame and drop the agitator hub over the tube 45.

The structure is very easy to operate and may be readily driven through the hand lever 40. A motor of small horse power is sufficient.

We have illustrated and described our improvements in a form in which we have embodied the same in practice. We have not attempted to illustrate or describe various modifications which we contemplate as being possible, other than the modification in which the wringer is omitted, as we believe the disclosure made will enable those skilled in the art to which this invention relates to embody the same as conditions may require. We desire, however, to be understood as claiming our improvements specifically in the form illustrated as well as broadly within the scope of the appended claims.

Having thus described our invention, what we claim is new and desire to secure by Letters Patent is:

1. In a structure of the class described, the combination, with the frame, of a horizontally disposed driving shaft, a horizontally disposed crank wheel provided with a beveled gear arranged at the inner end of the driving shaft, a beveled gear on the inner end of said driving shaft meshing with said crank wheel gear, a horizontally disposed lever pivoted to oscillate above said driving shaft and transversely thereof, a connecting rod connecting said crank wheel and lever, a segment provided with an arm mounted between said crank wheel and lever, a link connecting said arm to said lever, an actuating gear having a hub with a spindle socket therein, meshing with said segment, said gear being mounted centrally above said driving shaft and between said crank wheel and lever, an actuated member provided with a spindle adapted to engage the socket of said actuating gear.

2. In a structure of the class described, the combination with the frame, of a horizontally disposed driving shaft, a horizontally disposed crank wheel provided with a beveled gear arranged at the inner end of the driving shaft, a beveled gear on the inner end of said driving shaft meshing with said crank wheel gear, a horizontally disposed lever pivoted to oscillate above said driving shaft and transversely thereof, a connecting rod connecting said crank wheel and lever, a segment provided with an arm mounted between said crank wheel and lever, a link connecting said arm to said lever, and an actuating gear mounted centrally above said driving shaft and between said crank wheel and lever.

3. In a structure of the class described, the combination with the frame, of a horizontally disposed driving shaft, a horizontally disposed crank wheel provided with a beveled gear, a gear on said driving shaft meshing with said crank wheel gear, a horizontally disposed lever pivotally mounted on said frame above said driving shaft, an actuating gear mounted above said driving shaft between said crank wheel and lever, a link connecting said lever to said crank wheel disposed at one side of said actuating gear, a segment meshing with said actuating gear disposed at the other side thereof, and a link connecting said segment to said lever.

4. In a structure of the class described, the combination with the frame, of a driv-

shaft, a crank wheel provided with a beveled gear, a gear on said driving shaft meshing with said crank wheel gear, a pivotally mounted lever, a connecting rod connecting said crank wheel and lever, a segment, a link connecting said segment to said lever, an actuating gear having a spindle socket therein meshing with said segment, a body member having a tube mounted thereon, an actuated member provided with a spindle projecting from the lower end of said tube and engaging the socket of said actuating gear.

5. In a structure of the class described, the combination with the frame of a driving shaft, a crank wheel provided with a gear, a gear on said driving shaft meshing with said crank wheel gear, a lever pivotally mounted on said frame, a spider disposed on said frame between said crank wheel and lever and above said driving shaft, an actuating gear disposed below and having a bearing in said spider, a link connecting said lever to said crank wheel disposed below said spider on one side of said actuating gear, a segment disposed below and having a bearing in said spider at the other side of said actuating gear, and a link connecting said segment to said lever.

6. In a structure of the class described, the combination with the frame, of a crank wheel, means for driving said crank wheel, a lever pivotally mounted on said frame, an actuating gear mounted between said crank wheel and lever, a link connecting said lever to said crank wheel disposed on one side of said actuating gear, a segment meshing with said actuating gear disposed at the other side thereof, and a link connecting said segment to said lever.

7. In a structure of the class described, the combination with the frame, of a driving mechanism, comprising an actuating member mounted on said frame and having a spindle socket therein, a body member removably mounted on said frame having an upwardly projecting tube mounted thereon, and an actuated member with a hub-like sleeve adapted to embrace said tube and with a spindle secured to the upper end of said sleeve and projecting from the lower end of said tube when the actuated member is in position and into engagement with the socket of said actuating member, said actuated member being carried by its spindle, said spindle being unsecured to said actuating member and being freely removable from said tube.

8. In a structure of the class described, the combination with the frame, of a driving mechanism comprising an actuating member mounted on said frame and having a spindle socket therein, a body member having an upwardly projecting tube thereon, and an actuated member provided with a spindle projecting from the lower end of said tube into engagement with the socket of said actuating member, said actuated member being carried by its spindle, said spindle being unsecured to said actuating member and being freely removable from said tube.

9. In a structure of the class described, the combination with the frame, of a driving mechanism comprising an actuating member mounted on said frame, a body member removably mounted on said frame and having an upwardly projecting tube thereon, and an actuated member provided with a hub-like sleeve adapted to embrace said tube and with a spindle secured to the upper end of said sleeve and projecting from the lower end of said tube when the actuated member is in position and having driving engagement with said actuating member, said actuated member being carried by its said spindle, said spindle being freely removable from said tube.

10. In a structure of the class described, the combination with the frame, of a driving mechanism comprising an actuating member mounted on said frame, a body member removably mounted on said frame and having an upwardly projecting tube thereon, and an actuated member provided with a spindle projecting from the lower end of said tube when the actuated member is in position and having driving engagement with said actuating member, said actuated member being carried by its said spindle, said spindle being freely removable from said tube.

In witness whereof, we have hereunto set our hands and seals in the presence of two witnesses.

FRED A. MILLS. [L. S.]
SAM W. MILLS. [L. S.]

Witnesses:
M. PHINA WOODRUFF,
PEARL E. LILLIE.

1402 (Part of Defendant's Exhibit 13.)

(U. S. Letters Patent No. 1,209,893 to H. F. Snyder, December 26, 1916.)

1112

H. F. SNYDER.

GEARING.

APPLICATION FILED MAR. 11, 1915.

1,209,893.

Patented Dec. 26, 1916.

2 SHEETS—SHEET 1.

Fig. 1.

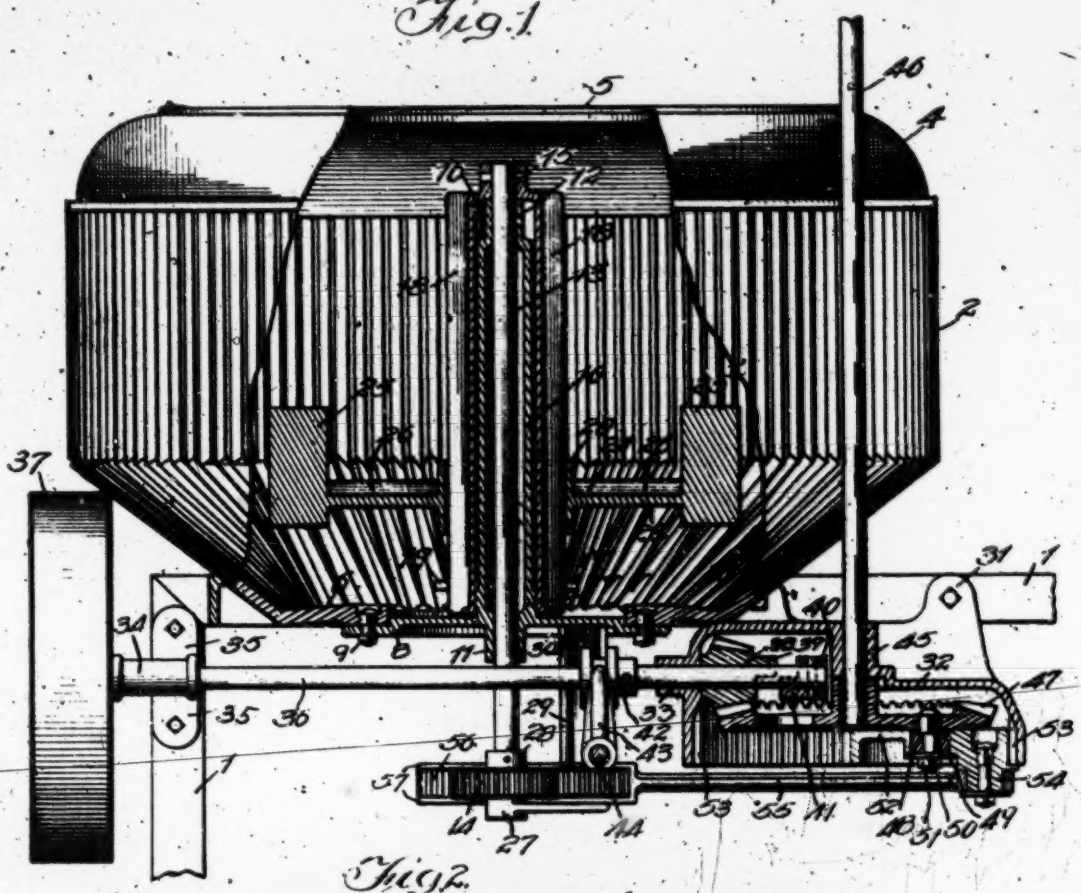
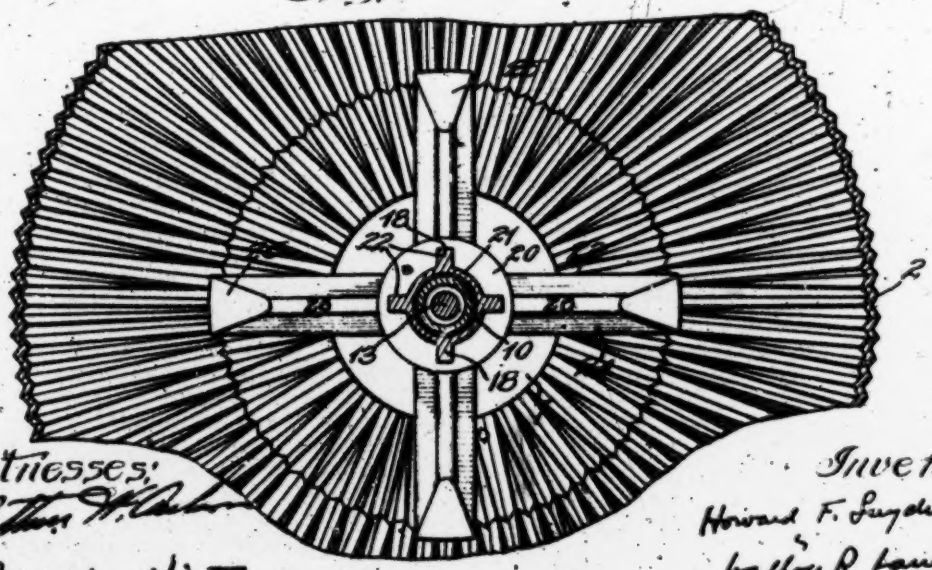


Fig. 2.



Witnesses:

Sebastian Hinton

Inventor:

Howard F. Snyder

by Wallace R. Lane

Attys.

1114

H. F. SNYDER.

GEARING.

APPLICATION FILED MAR. 11, 1915.

1,209,893.

Patented Dec. 26, 1916.

2 SHEETS—SHEET 2.

Fig. 3.

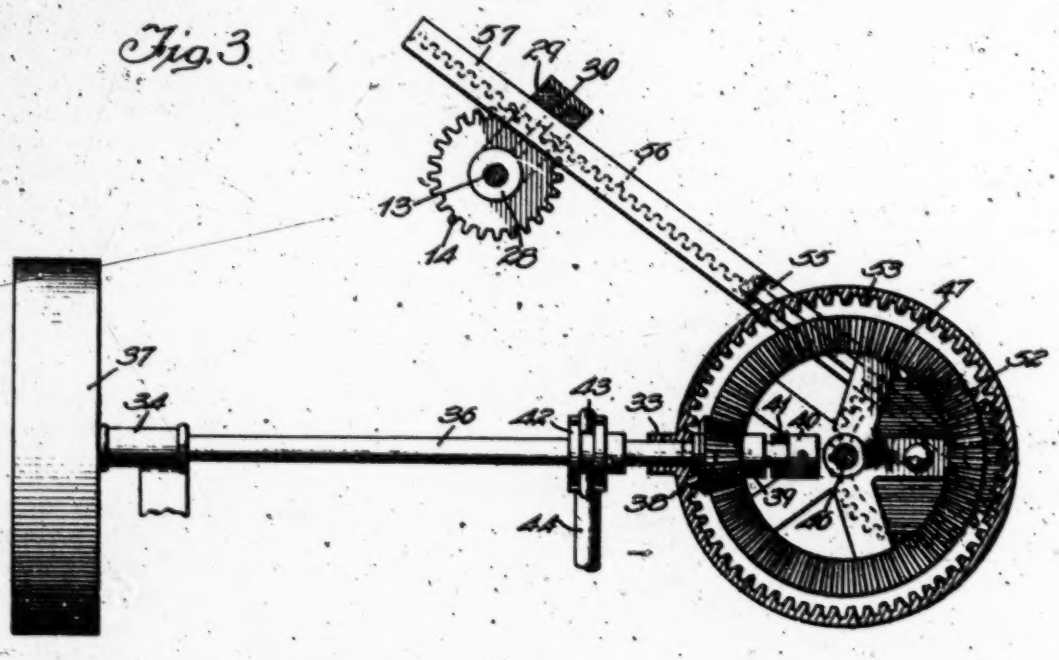
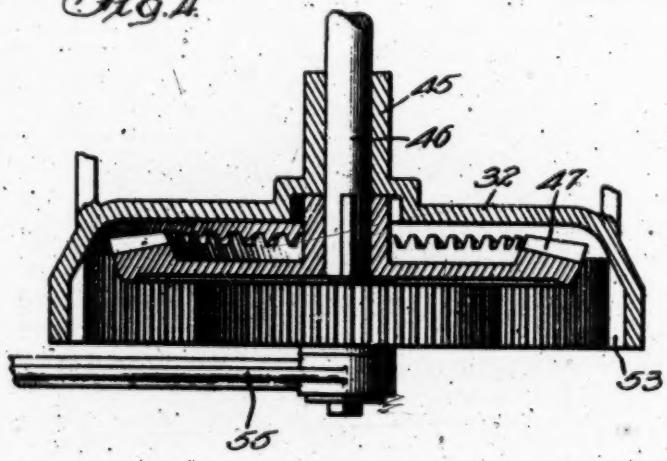


Fig. 4.



Witnesses:

Arthur H. Carlson

Sebastian Hinton

Inventor:

Howard F. Snyder

By Wallace R. Lane

Atty's.

UNITED STATES PATENT OFFICE.

HOWARD F. SNYDER, OF NEWTON, IOWA, ASSIGNOR TO THE MAYTAG COMPANY, OF NEWTON, IOWA, A CORPORATION OF IOWA.

GEARING.

1,209,893. Specification of Letters Patent. Patented Dec. 26, 1916.

Application filed March 11, 1915. Serial No. 13,560.

To all whom it may concern:

Be it known that I, HOWARD F. SNYDER, a citizen of the United States, residing at Newton, in the county of Jasper and State of Iowa, have invented certain new and useful Improvements in Gearing, of which the following is the specification.

This invention relates to washing machines and gearing therefor, and particularly to dolly construction and dolly operating mechanism for such machines.

It is an object of this invention to provide a dolly which acts upon the clothes from below instead of from above, whereby the action of the dolly will not be affected by the amount of clothes in the tub, and a very few clothes may be washed as perfectly as the ordinary full charge for the machine.

It is another object of this invention to provide a gearing mechanism for driving the dolly of a washing machine in which said dolly will be given a continuous periodic rotary movement in addition to its oscillations, so that the clothes in the tub in addition to being swished back and forth will be also continuously periodically rotated, or revolved back and forth so as to assume different positions about the tub as they are being swished back and forth therein.

Further objects and advantages of the invention will appear as the description to follow proceeds.

In the drawings, Figure 1 is an elevation partly in section of the washing machine constructed according to my invention. Fig. 2 is a sectional plan view of a portion thereof. Fig. 3 is a sectional plan view upon another plan of the operating mechanism for the dolly. Fig. 4 is a sectional elevation of a portion of said gearing.

In the drawings 1 refers to the frame or bench of a washing machine, preferably made up of metallic angle bars. 2 represents the tub mounted in said frame or bench. The tub 2 it is to be particularly noted is of peculiar and novel form and includes a tapered bottom 3 and a dome 4 and lid 5. It is preferably cast in one piece save for the lid, and from aluminum. The bottom 6 of the tub is provided with a central aperture 7 which is closed by the circular plate 8, fastened therein by means of bolts such as 9. Preferably cast integral with the plate 8 is the upstanding sleeve 10 having bearings 11 and 12 at its upper and lower ends in which is mounted the vertical dolly operating shaft 13 having upon its lower end a pinion 14 by which it is driven by mechanism and in a manner now to be described.

Secured to the top of the shaft 13, as for instance by the pin 15, is the sleeve 16 which overlaps the sleeve 10 and is snugly fitted thereabout on the integral collar 17 at the bottom of the sleeve 10 whereby wabbling of the sleeve 16 is prevented. The sleeve 16 is provided with a number (in this instance four) of blades 18 and adjacent its bottom is provided with outstanding pins or rests 19.

The dolly proper is of a novel form comprising an elongated central hub 20 having a central aperture 21 and slots 22 so as to be slidable up and down upon the sleeve 16 and to be engaged with the blades 18 thereof to prevent rotative displacement with respect thereto. Projecting radially from the hub 20 are the arms 23 which are rounded on their upper surfaces, as shown at 24, and are provided at their outer ends with the washing blades 25 which project a considerable distance upwardly from the arms 23 and downwardly to the level of the bottom of the hub 20. Spanning the hub 20 and the blades 25 are the webs 26 which assist in the stirring action of the dolly in an obvious manner.

In operation the dolly is placed upon the sleeve 16, and slides down thereon until the bottom of the collar 20 rests upon the pins 19 after which the water and clothes may be placed in the tub and the machine operated in the ordinary fashion, the washing blades 25 gripping the clothes to carry them back and forth in the tub and rubbing them against the corrugated sides thereof, and the webs 26 assisting in the stirring action. By this means the clothes are operated upon from below and it is immaterial how full a charge is put into the machine, the operation upon the clothes being the same no matter whether few or many are being washed at one time. Moreover, the tapered bottom of the tub coöperates with the new form of dolly so as to cause the clothes at all times to come into operative engagement therewith.

I will now describe the gearing for driving the new dolly.

The pinion 14 on the bottom of the shaft 13 is interposed between the bearings 27 and the collar 28, the bearings 27 being integral with the bracket 29 which has thereon the upstanding web 30 which is rounded at its outer end. The bracket 29 is preferably formed integrally with the plate 8 which closes the bottom of the tub.

Secured to the frame 1 of the machine by lugs or ears, such as 31, is a depending housing 32 provided with a horizontal bearing 33 in alinement with the bearing 34, secured to the frame 1 by ears or lugs such as 35. Mounted in the bearings 33 and 34 is the driving shaft 36 provided at its end with the driving belt wheel 37. Keyed to the shaft 36 adjacent its inner end is the beveled pinion 38 having projecting therefrom the clutch tooth 39. Pinned to the end of the shaft is the clutch element 40 having a tooth 41 for engagement with the clutch tooth 39. The shaft 36 is provided with a collar 42 in engagement with which is a fork 43 upon the rock shaft 44. By this means the shaft 36 may be shifted longitudinally to engage or disengage the driving connection with the pinion 38 in an obvious manner. Mounted in a vertical bearing 45 in the housing 32 is the shaft 46 which is preferably connected with the wringer. Secured to the shaft 46 at its lower end is the beveled crown gear 47 in mesh with the pinion 38 whereby the pinion 38 when in driving connection with the pulley 37 drives the gear 47. Upon the lower face of the gear 47 is secured a journal 48 by means of the bolt 49, washer 50 and nut 51. Revolubly mounted upon the journal 48 is the gear 52 in mesh with the internal gear 53 which forms a depending extension of the housing 32. It is to be noted that the pitch circle of the gear 52 does not intersect the axis of the gear 53. Therefore the gear 52 does not occupy the same relative position during successive revolutions of the gear 47. In other words, the planetary pinion contains a number of teeth unequal to one-half of the total number of teeth in the internal gear, and therefore the action is not cyclic but a traverse is caused because the axis of the gear 52 will occupy different positions upon successive revolutions of the gear 47. The gear 52 has seated therein and secured thereto the journal 54 which projects downwardly below the plane of the internal gear 53 and forms a crank pin for the pitman 55 which, at its other end, terminates in the rack 56 in engagement with the pinion 14. The rack 56 is provided with inwardly projecting flanges 57 at its top and bottom which embrace the pinion 14 and keep the rack 57 in proper alinement therewith. The back of the rack 57 is in more or less loose contact with the rounded edge of the web 30 hereinabove described, whereby the rack 57 may pivot on the web 30 being kept at all times in engagement with the pinion 14 thereby.

In operation and assuming that the rock shaft 44 is rocked to the left from the position shown in Fig. 1 so as to engage the pinion 38, the rotation of the driving shaft will continuously drive the beveled crown gear 47. This will cause the gear 52 to be trailed around inside the internal gear 53 and thus both revolve with the gear 47 and rotate on the journal 48 on account of its engagement with the internal gear 53. The rotation of the gear 52 upon its own axis will, by means of the pitman connection, cause the rack 56 to be reciprocated correspondingly oscillating the shaft 13 and therefore the dolly in the washing machine. Superposed upon this motion, however, is the revolution of the gear 52 as it is carried around by means of the crown gear 47. This latter movement will obviously cause the pitman 55 to move backward and forward periodically while it is reciprocating and will thus cause a periodic backward and forward rotation of the pinion 14 and therefore of the dolly, in addition to the oscillatory movement of these parts. In short, on each oscillation the dolly will move farther in one direction than in the other so that the clothes in the tub will be periodically rotated back and forth in addition to being swished back and forth through the water by the oscillation of the dolly. By this means all of the clothes in the tub will receive equal action from the machine irrespective of their position therein, and the action of the machine upon the clothes will be augmented and its effect increased.

Having now described my invention I claim:

1. A gearing for washing machines comprising a driving shaft, a driven gear, a pinion on said driven gear, an internal gear with which said pinion meshes and an operating member connected to said pinion, the pitch circle of said pinion not intersecting the axis of the internal gear, whereby said pinion does not keep the same relative position during successive revolutions of the gear.

2. A gearing for washing machines comprising a driving shaft, a driven gear, a pinion on said driven gear, an internal gear having a number of teeth unequal to twice the number of teeth in the pinion with which said pinion meshes and an operating member connected to said pinion, and a clutch for operatively connecting and disconnecting said shaft and said driven gear.

3. In a gearing for washing machines, a shaft, a vertically arranged reciprocating operating member, gear connections between

said shaft and said vertically arranged reciprocating operating member including means to cause the traverse of said operating member in addition to its normal operating motion.

4. In a gearing for washing machines, an oscillatory shaft having a pinion thereon, a rack bar in mesh with said pinion, means to reciprocate said rack bar including means to cause different regions of said bar to engage said pinion during different reciprocations of said bar.

5. In a gearing for washing machines, an oscillatory shaft, a rotary shaft, connections between said rotary shaft and said oscillatory shaft including means whereby a periodic oscillatory movement is given to said shaft in addition to the successive oscillations thereof.

6. In a gearing for washing machines, a shaft having a pinion thereon, a gear in mesh with said pinion, another gear carried by said first gear, an internal gear in mesh with said second gear and having a number of teeth unequal to twice the number of teeth thereon and a pitman connected to said second gear.

7. In a gearing for washing machines, a shaft having a pinion thereon, a gear in mesh with said pinion, another gear carried by said first gear, an internal gear in mesh with said second gear, a pitman, and a shaft adapted to be operated by said pitman, the pitch circle of said pinion not intersecting the axis of said internal gear.

8. In a gearing for washing machines, a shaft having a pinion thereon, a gear in mesh with said pinion, another gear carried by said first gear, an internal gear in mesh with said second gear and having a non-cyclic relation thereto, a pitman and a clutch for connecting and disconnecting said pinion and gears.

In witness whereof, I hereunto subscribe my name to this specification in the presence of two witnesses.

HOWARD F. SNYDER.

Witnesses:

A. R. McKinley,

H. E. Galusha.

1407 (Part of Defendant's Exhibit 13.)

(U. S. Letters Patent No. 273,569 to C. Marchand, March 6, 1893.)

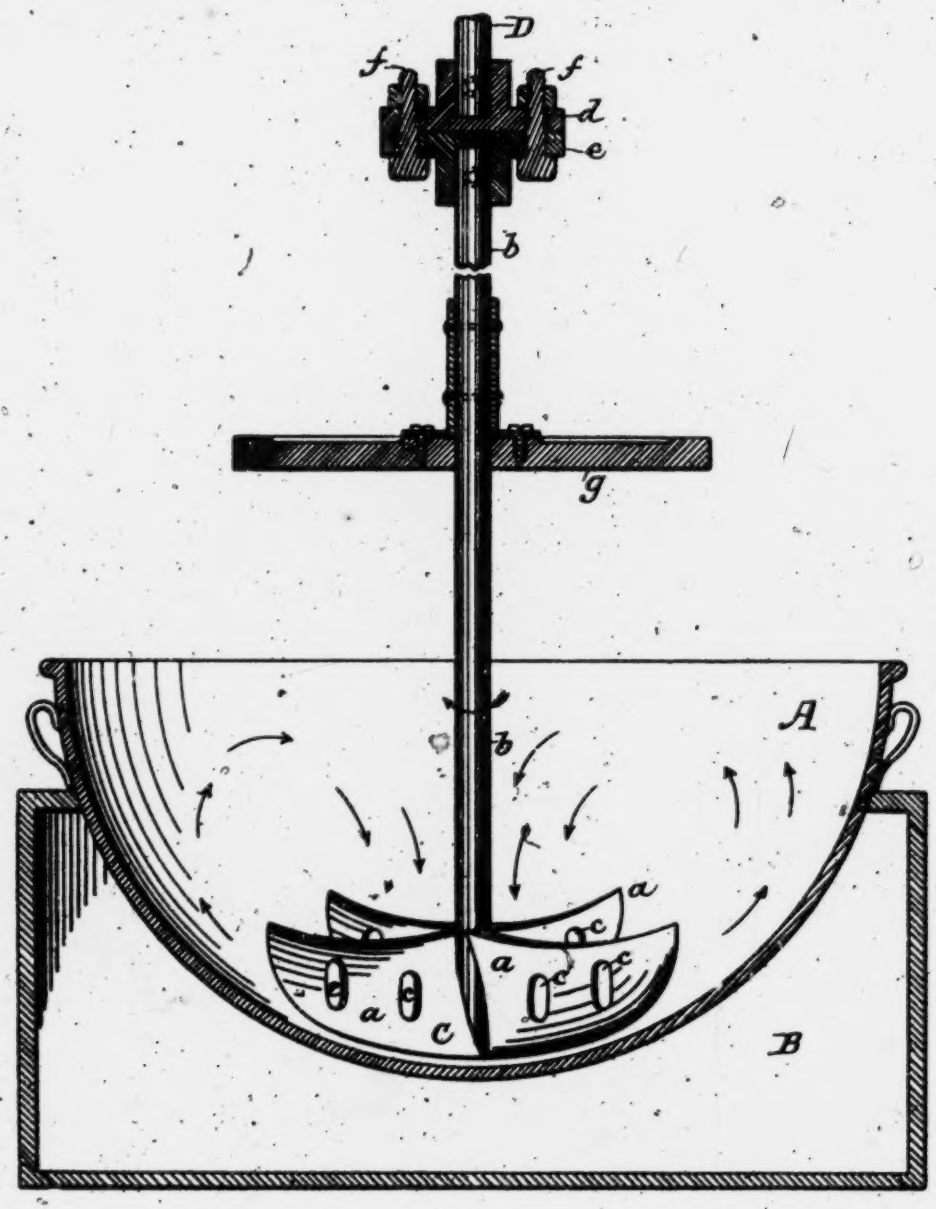
1120

(No Model.)

C. MARCHAND.

MANUFACTURE OF HYDROGEN PEROXIDE.

No. 273,569. Patented Mar. 6, 1883.



Witnesses:

E. E. Masson

Philip Mauro

Inventor:

Charles Marchand

by A. Pollok

his Atty

UNITED STATES PATENT OFFICE.

CHARLES MARCHAND, OF NEW YORK, N. Y.

MANUFACTURE OF HYDROGEN PEROXIDE.

SPECIFICATION forming part of Letters Patent No. 273,569, dated March 6, 1883.

Application filed August 2, 1882. (No model.)

To all whom it may concern:

Be it known that I, CHARLES MARCHAND, of New York city, in the county and State of New York, have invented a new and useful Improvement in the Manufacture of Hydrogen Peroxide, which improvement is fully set forth in the following specification.

This invention has reference to the manufacture of hydrogen peroxide or oxygenated water by addition of barium or calcium binoxide to an acid, (sulphuric, nitric, acetic, oxalic, hydrochloric, hydrofluoric, hydrofluosilic, and the like,) the binoxide having been mixed with water.

Heretofore hydrogen peroxide has been made by adding the barium or calcium binoxide, mixed with water, to the diluted acid, the binoxide being added from time to time in small quantities, the vessel in which the operation is conducted being set in a refrigerating medium, and the liquid being agitated or stirred to facilitate the reaction. The stirring has been performed by hand.

The present invention is based on the fact or discovery that the reduction of the barium or calcium binoxide takes place under conditions much more favorable in point of rapidity and yield when the acid to be neutralized is given a movement of rotation both vertically and horizontally by a screw or other suitable means, which at the same time creates both constant and ever-changing eddies, the said movement of rotation being imparted continuously during the addition of the binoxide.

The present invention consists, therefore, first, in imparting to the acid a movement of rotation, the time required for the chemical reaction being thereby lessened, while the reaction itself is more complete.

The apparatus shown in the accompanying drawing is preferably employed, and forms also part of the invention. A view in vertical section and elevation is given.

A is the receptacle for the acid; B, a jacketing-vessel for containing the refrigerant or cooling medium; C, the screw, and D a vertical power-shaft. The acid-receptacle need not be of any particular size, but a good capacity is from five hundred to one thousand gallons. It is preferably hemispherical, but may be cylindrical, frusto-conical, or other suitable form; and it is made of or lined with material adapted to resist the action of the acid. For use with hydrofluoric acid, a sheet-iron or, better, a copper vessel lined with lead may be used, or one of platinum, gold, or silver, or one otherwise rendered non-corrodible. The screw C is provided with helicoidal blades *a*, ordinarily two, three, or four in number, set obliquely on the arbor or screw-shaft *b*. The blades are preferably pierced with holes *c*. The screw is suspended in the receptacle A, being detachably connected with the lower end of the power-shaft D by the pieces *d e*—one fixed to the power-shaft and the other to the screw-shaft, and clamped together by the bolts *f*. On the screw-shaft, above the top of the receptacle A, is fixed a disk, *g*, of wood or other suitable material, which catches the oil from the bearings of the power-shaft, and other foreign matters that otherwise would be liable to fall into the receptacle. The power-shaft is suspended in its bearings by suitable collars, which enable it to support the screw C, and is driven from a horizontal shaft through beveled gearing, or by other well-known or suitable mechanical means. The length of the screw-shaft is such that the blades of the screw do not in operation touch or scrape the interior of the receptacle A. The jacketing-vessel B is of ordinary or suitable construction. The cooling medium commonly employed therein may be placed in it.

The vessel B being filled with the cooling medium, the proper quantities of acid and water (say twenty parts, by weight, of acid to one hundred parts of water, or other suitable proportions) are placed in the receptacle A. The screw C is put in motion, and the binoxide of barium or calcium, in the state of a more or less thick emulsion or milk, is added in small quantities. The revolving screw imparts a movement of rotation more or less rapid to the liquid, producing eddies therein and constantly changing the material, and the chemical reaction takes place very regularly and completely. Sufficient binoxide is added to secure the complete neutralization of the acid without rendering the hydrogen peroxide too alkaline. After a certain time, which varies with the quantity of the article manufactured and the amount of binoxide employed,

and during which the screw may be stopped, but is preferably kept in revolution, the production of the hydrogen peroxide is finished. It only remains to allow the matters in suspension to settle and to decant the clear liquor.

If it is desired to obtain the hydrogen peroxide in a state of greater purity than results from the above, the clear liquor is subjected to special chemical treatment, which, as it constitutes no part of the present invention, need not be described.

I claim the new improvements herein described, all and several, to wit:

1. The method of making hydrogen peroxide by cooling the acid solution, imparting thereto a continuous movement of rotation, as well in vertical as in horizontal planes—such, for example, as imparted by a revolving screw in a receptacle—and adding to said acid solution the binoxide in small quantities while maintaining the low temperature and the rotary or eddying movements, substantially as described.

2. The combination of the receptacle, the screw suspended therein so as not to touch the bottom, and the protecting or covering disk carried by the screw-shaft, substantially as described.

3. The combination of the receptacle, the power-shaft, the screw, and the means for detachably connecting the said screw with said power-shaft and for suspending it therefrom in said receptacle, substantially as described.

4. The apparatus described, comprising in combination the receptacle for the acid, the jacketing-vessel, the power-shaft, the suspended screw, and the means for preventing foreign matter from falling into the receptacle, substantially as set forth.

In testimony whereof I have signed this specification in the presence of two subscribing witnesses.

CH. MARCHAND.

Witnesses:
R. S. HAYWARD,
G. H. PEARSALL.

1410 (Part of Defendant's Exhibit 13.)

(U. S. Letters Patent No. 832,787 to W. C. Foster & L. E. Garrison, October 9, 1906.)

1124

No. 832,787. PATENTED OCT. 9, 1906.

W. C. FOSTER & L. E. GARRISON.

WASHING MACHINE.

APPLICATION FILED JUNE 19, 1905.

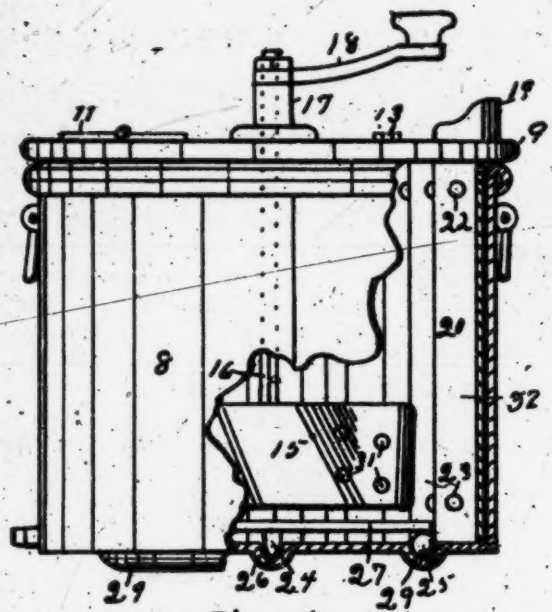


Fig. 1.

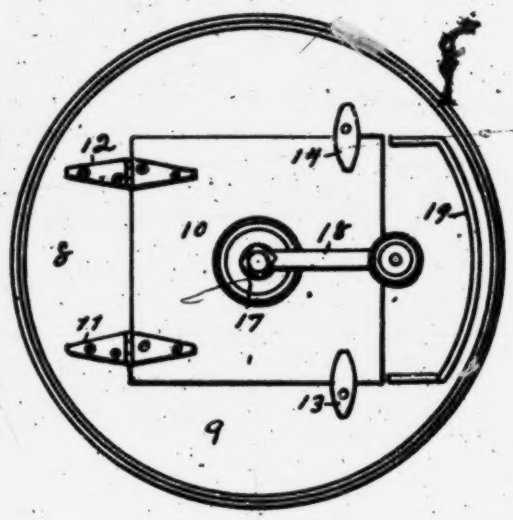


Fig. 2.

Fig. 3.

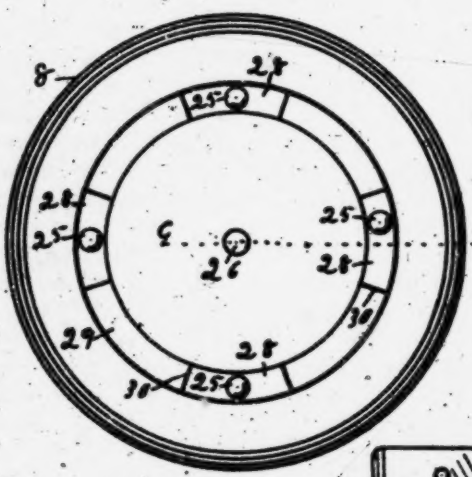


Fig. 4.

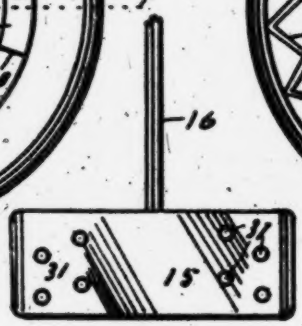


Fig. 6.

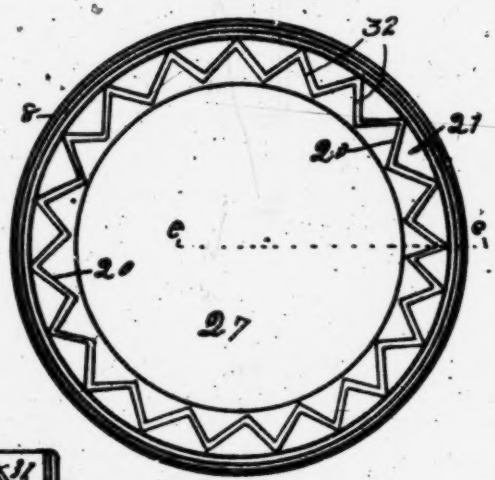


Fig. 5.

Fig. 7.

WITNESSES:

R. G. West

Ida M. Hawkins

INVENTORS:

Willard C. Foster

Lewis E. Garrison

BY

Lucius C. West.

ATTORNEY.

UNITED STATES PATENT OFFICE.

WILLARD C. FOSTER AND LEWIS E. GARRISON, OF KALAMAZOO, MICHIGAN; SAID FOSTER ASSIGNOR TO D. W. PHILLIPPY, OF KALAMAZOO, MICHIGAN.

WASHING-MACHINE.

No. 832,787. Specification of Letters Patent. Patented Oct. 9, 1906.

Application filed June 19, 1905. Serial No. 266,077.

To all whom it may concern:

Be it known that we, WILLARD C. FOSTER and LEWIS E. GARRISON, citizens of the United States, and residents of Kalamazoo, in the county of Kalamazoo, State of Michigan, have jointly invented a new and useful Washing-Machine, of which the following is a specification.

The object of this invention is to facilitate the washing of clothes by the forceful contact of hot water against and through the clothes by the means of the improved features of construction herein described and claimed.

In the drawings forming a part of this specification, Figure 1 is a side elevation with a portion in section on dotted line *c c* in Fig. 4 and on dotted line *e e* in Fig. 5; Fig. 2, plan of Fig. 1; Fig. 3, an end view of the bottom of Fig. 6; Fig. 4, interior plan of bottom of machine; Fig. 5, plan of Fig. 1 with top and agitator removed; Fig. 6, side elevation of the agitator with rod broken away, and Fig. 7 is a plan of Fig. 6.

The parts of the drawings are pointed out by numerals.

The ordinary metal washtub 8 is provided with a cover 9, which cover has a door 10, hinged at 11 and 12 and held closed by buttons 13 and 14. Through the door 10 the hot water is put in, and the clothes and the agitator 15 are put in and taken out. A rod 16 of the agitator 15 extends up through a bearing-tube 17, attached to the center of the cover 9, and a crank 18 is attached to the upper end of said rod 16 and held by a nut.

It is our purpose to provide the machine with the two following important features: first, hot-air and hot-water spaces within the wall of the tub 8 and circling around the tub interior and separated from the same to prevent the hot water in the machine in which the clothes are being washed from cooling too fast; second, a circular row of flat surfaces at right angles to each other in the interior of the machine, where the washing of clothes is being done, in a manner that the water will be splashed squarely against said flat surfaces by the action of the agitator 15, and from which surfaces said water is reacted back against and through the clothes. We accomplish these two purposes or objects in a cheap and very simple manner by providing the shell 20 and in the manner of its construction. This shell is metal and hood or drum like in form and open at top and bottom ends. Its thin wall is bent to form coarse corrugations, which thus appear on both the outer and inner surface of the wall of the shell 20. The size of this corrugated shell is such that it will closely and easily and detachably fit into the tub 8, as in Figs. 1 and 5, the apexes of the outer corrugations just touching the interior of the wall of the tub 8, as in Figs. 1 and 5, and thus establishing a circular row of hot-air and hot-water three-cornered spaces 21 entirely around the tub 8 between its wall and the wall of said corrugated shell 20.

By the touching of all the outer apexes of the corrugations against the inner wall of the tub more room in a given size construction is had for the clothes, the shell is held steady in one position, allowing of no side play and cramping, and the hot-air and hot-water spaces, though separate from and independent of each other, are located very close to each other and have more nearly the effect of a single space around the tub. At the same time by the same construction the inner flat surfaces above described are established, and said surfaces 32, Fig. 5, do not in any sense serve as rubbing-surfaces for the clothes. The clothes are freely tossed forth and back in the water in which they float by the agitator 15 in a manner to force the water through the clothes, and thus remove the dirt without wear. The raised portion 19 is for attachment of wringer. The corrugated shell 20 is provided with upper holes 22 and lower holes 23, leading into the spaces 21, through which holes, owing to their small size and fixed location, hot air and steam circulate with more or less force, acting upon the clothes. The shell 20 is easily detached for cleaning. The agitator 15 is an important feature, owing to its peculiar construction, by means of which the water is given an upward forward throw, some of it squarely against the inner flat angled surfaces of the shell 20, from which it reacts forcibly upon the clothes. The body of the agitator is thin and rectangular in form. The upper outer portion of one side at one end, the lower outer portion of the opposite side at the same end, the upper outer portion of

1126

said opposite side at the other end, and the lower outer portion of the first-named side at the latter-named end are all scooped out, as in Figs. 3, 6, and 7. The series of holes 31 through the body of the agitator allow the water to pass through and cause it to operate easier.

To cause the machine to operate easier if overloaded with clothes, we use a supplemental bottom 27, mounted on a central pivot 24 and ball-bearings 25, said pivot 24 loosely fitting a central socket 26 in the bottom of the tub 8. This bottom has downwardly-extending grooves 29, in which are partitions 30, forming pockets 28 for the balls 25. If care is used to not overload the washing-machine, the supplemental bottom can be dispensed with.

In the operation the supplemental bottom 27 and boiling hot water are placed in the tub 8. The cover 9 is placed on, observing to leave the door 10 open. As the agitator-rod 16 is loose in its bearing-tube 17, it can be moved up and down, so as to handle the door 10 and agitator 15 without disconnecting them. Now place in a few clothes and the agitator 15 and close and fasten door 10. Such soap may be used as desired. Swing the crank forth and back about the distance one can reach for perhaps ten minutes, or it may be entirely revolved now and then in alternation with the short swinging movement. Run the clothes through the machine more than once, if desired.

Having thus described our invention, what we claim as new, and desire to secure by Letters Patent of the United States of America, is—

In a washing-machine, an outer tub combined with a shell open at top and bottom, and made from a continuous metal band corrugated to form the inner and outer flat surfaces described, said shell adapted to fit detachably into the tub, the outer apexes of its corrugations touching the inner surface of the tub-wall making the three-cornered, separated, independent, hot-air and hot-water spaces closely located end to end to each other around the tub interior, and the small holes near the top and bottom of the shell leading through the same, substantially as set forth.

WILLARD C. FOSTER.
LEWIS E. GARRISON.

Witnesses:
S. H. VAN HORN,
FRANK NILLS.

1413 Defendant's Exhibit 14.

(Physical)

Snyder Glass Tub Machine

Defendant's Exhibit 15.

(Physical)

Doughty & Davis 1900 Form 4
Celluloid Tub Machine

Defendant's Exhibit 16.

(Physical)

Jardine Glass Tub Machine

Defendant's Exhibit 17.

(Physical)

G. E. Model AW-19 Glass
Tub Machine

Defendant's Exhibit 18.

(Physical)

Glass Tub Overhead Agitator
Machine

Defendant's Exhibit 19.

(Physical)

Miller Smooth Tub Machine

Defendant's Exhibit 20.

(Physical)

Davis 1900 Form 3 Machine

Defendant's Exhibit 21.

(Physical)

Replica Davis Overhead Impeller

Defendant's Exhibit 22.

(Physical)

Snyder Overhead Agitator

Defendant's Exhibit 23.

(Physical)

Glass Tub Variable Speed Machine

Defendant's Exhibit 24.

(Physical)

Morse Machine

THE MAYTAG COMPANY

vs.

GENERAL ELECTRIC SUPPLY CORPORATION

IN EQUITY 2892

DEFENDANTS EXHIBIT 25

DEFENDANT'S EXHIBIT 25.

Claim 38 Disclaimed	Claim 39 (Rearranged) Not Disclaimed	Claim 39 Not Disclaimed
The method of washing fabrics by forcing cleansing liquid through and around them	The method of washing fabrics by forcing cleansing fluid through them	The method of washing fabrics by forcing cleansing fluid through them
while substantially suspended by the action of the fluid,	while substantially suspended by the action of the fluid,	while substantially suspended by the action of the fluid,
as distinguished from pulling fabrics through the fluid against scrubbing corrugations or otherwise scrubbing them by mechanical means,	as distinguished from pulling fabrics through the fluid against scrubbing corrugations, or otherwise scrubbing them by mechanical means,	as distinguished from pulling fabrics through the fluid against scrubbing corrugations, or otherwise scrubbing them by mechanical means,
comprising immersing the fabrics in a washing fluid in a container,	comprising immersing the fabrics in a washing fluid in a container,	comprising immersing the fabrics in a washing fluid in a container,
then vigorously and rapidly impelling the washing fluid	then vigorously agitating the washing fluid and rapidly forcing it	then vigorously agitating the washing fluid and rapidly forcing it
in one and then in an opposite outward circulatory direction	* * first in one and then in an opposite * * direction	toward the fabrics and away from the plane of the source of agitation
away from the plane of the source of impulsion	vertically and away from the plane of the source of agitation	vertically along the interior surface of the container
and through the fabrics	toward the fabrics * * back and forth through and around the fabrics	first in one and then in an opposite
and circumferentially along the interior of the container in rapid succession,	along the interior surface of the container * * circumferential	circumferential direction back and forth through and around the fabrics
and causing these violently opposed currents of fluid to meet	and causing the violently moving opposed currents of liquid to meet	and causing the violently moving opposed currents of liquid to meet
and flow inwardly and toward the central portion of the container	and flow inwardly	and flow inwardly
and toward the source of impulsion	and vertically toward the source of agitation	and vertically toward the source of agitation
thereby substantially suspending the fabrics in the fluid	whereby the fabrics are caused to be freely moved about by the action of the fluid	whereby the fabrics are caused to be freely moved about by the action of the fluid
and cleansing them while thus suspended.	and cleansed while thus moved.	and cleansed while thus moved.

Claim 20 of Snyder Patent
Not Disclaimed

U. S. D. C. W. D. Mo. W. D.
THE MAYTAG COMPANY
vs.
GENERAL ELECTRIC SUPPLY CORPORATION
IN EQUITY 2392
DEFENDANTS EXHIBIT 26

DEFENDANT'S EXHIBIT 26 1131

20. In a washing machine, a tub,

a driving shaft extending into the tub,

an agitater secured to said shaft to oscillate therewith,

power means for oscillating said shaft and agitator,

said agitator comprising a substantially circular body portion

having blades extending therefrom on the face presented to the material being washed, the blades adjacent the marginal edge of the body portion being of a substantial dimention in a direction at right angles to the body portion,

said body portion being free of any holes or openings of substantial dimensions,

said blades and adjacent portions of the body portion of the agitator when the agitator is oscillated throwing the fluid in the tub, and material being washed, violently outwardly from the edge of the agitator whereby it will flow in circulatory paths away from the agitator, along the sides of the tub, ther inwardly and back toward the agitator, this cycle being continuously repeated.

G. L. DAVIS.
AGITATOR FOR WASHING MACHINES.
APPLICATION FILED FEB. 26, 1916.

1,240,826. Patented Sept. 25, 1917.

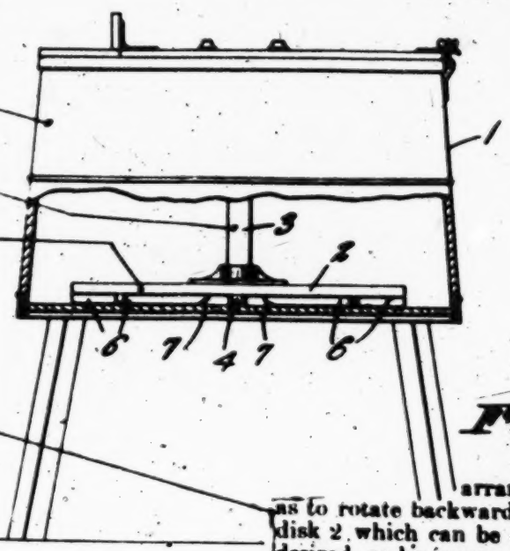


Fig. 1.

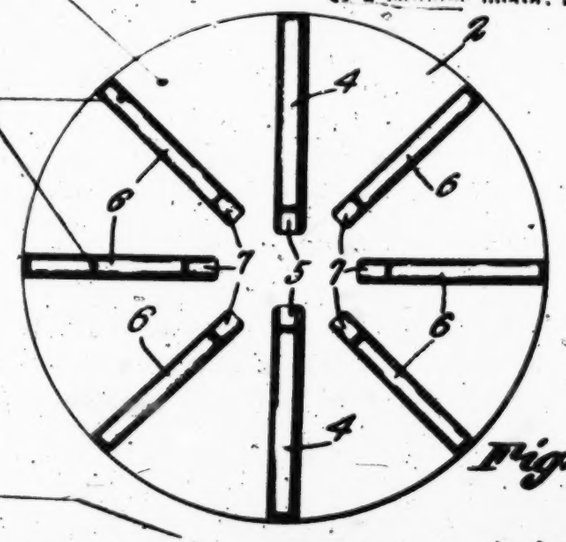


Fig. 2.

arranged within the tub so as to rotate backwardly and forwardly is a disk 2 which can be driven in any manner desired, as by means of a shaft 3 connected to a suitable motor, not shown.

One of the objects of the invention is to provide an agitator having a novel arrangement of ribs or vanes on the lower or active face thereof and which operate to direct the water outwardly by centrifugal force, thereby setting up a circulation downwardly within the tub adjacent the wall thereof, and thence upwardly through the fabrics in the tub and to the center of the space below the agitator.

The disk is then rotated backwardly and forwardly and during this movement the ribs 4 and 6 will have two functions. First they will throw the upper portion of the water by centrifugal force toward the wall of the tub, thus creating a suction under the center of the disk, with the result that the water displaced upwardly by this suction will force its way through the fabrics and will create a circulation inwardly adjacent the bottom of the tub and downwardly adjacent the wall thereof.

1416 Defendant's Exhibit 27.

(Physical)

1900 Form 1 Machine

Defendant's Exhibit 28.

(Physical)

Miller Corrugated Tub Machine

Defendant's Exhibit 29.

(Physical)

1900 Form 4 Machine

Defendant's Exhibit 30.

(Physical)

1900 Experimental Model Machine

DEFENDANT'S EXHIBIT 31.

1133

DEPARTMENT OF COMMERCE
UNITED STATES PATENT OFFICE

To all persons to whom these presents shall come, Greeting:

THIS IS TO CERTIFY that the annexed is a true copy from the records of this office of the Petition, Specification, Oath and Drawings, as originally filed, April 8, 1922, Serial Number 550,607, in the matter of the

Letters Patent of

Herman W. Doughty and George L. Davis, Assignors to The Nineteen Hundred Washer Company,

Number 1,496,305, Granted June 3, 1924,

for

Improvement in Washing Machines.

U. S. D. C. W. D. Mo. W. D.
THE MAYTAG COMPANY
vs.
GENERAL ELECTRIC SUPPLY CORPORATION
IN EQUITY
DEFENDANTS EXHIBIT 31

IN TESTIMONY WHEREOF I have hereunto set my hand and caused the seal of the Patent Office to be affixed, at the City of Washington, this twentieth day of November, in the year of our Lord one thousand nine hundred and thirty-seven and of the Independence of the United States of America the one hundred and sixty-second.

ATTEST:

Chief of Division.

Commissioner of Patents.

MAR 16 1922 U.S.PAT.OFFICE

4741

PETITION

TO THE COMMISSIONER OF PATENTS:

Your petitioners, HERMAN W. DOUGHTY and GEORGE L. DAVIS, both citizens of the United States and residents of Binghamton, in the County of Broome and State of New York, whose post office address is Care of The Nineteen Hundred Washer Company, Binghamton, New York, pray that Letters Patent may be granted to them for new and useful improvements in WASHING MACHINES, set forth in the annexed specification, and they hereby appoint Merrell E. Clark, of 5 Nassau Street, New York, New York, their attorney, with full power of substitution and revocation, to prosecute this application and to make alterations and amendments therein, to receive the patent and to transact all business in the Patent Office connected therewith.

Herman W. Doughty

George L. Davis

Signed at Binghamton, New York, on the 23rd day of March, 1922.

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550607
1/2

SPECIFICATION

TO ALL WHOM IT MAY CONCERN:

Be it known that we, HERMAN W. DOUGHTY and GEORGE L. DAVIS, citizens of the United States and residents of Binghamton, County of Broome and State of New York, have jointly invented certain new and useful Improvements in WASHING MACHINES, of which the following is a description.

This invention relates to washing machines for washing clothes, and particularly to machines of this character which are operated by power as distinguished from hand-operated machines. Certain features of our invention, however, are applicable alike to machines of both of these types, as will appear hereinafter.

The primary object of our invention is to provide a machine of the character described, which shall be at once accessible, convenient and efficient.

The particular type of machine illustrated and described herein is what is sometimes called the "agitator" type. That is to say, it includes a stationary tub for receiving the clothes to be washed and the cleansing fluid, such as soapy water, and a movable "agitator" within the tub and adapted by its movement to agitate the cleansing fluid and the clothes and thus cause the cleansing fluid to penetrate the clothes and clean them. Heretofore the agitator in machines of this type has generally been so arranged as to overlie the clothes during the washing operation. This has made it necessary to remove the agitator before clothes could be placed in the tub or removed therefrom. In order to eliminate this inconvenience we have placed the agitator adjacent the bottom of the tub, so that it underlies the

and we have discovered that an agitator so placed is more efficient if of an unsymmetrical design.

Accordingly it is one object of our invention to provide an agitator which is adapted to underlie the clothes, and which is so designed as to render it highly efficient.

Another object of our invention is to provide novel and efficient actuating means for the agitator.

Still another object of our invention is to provide improved means for mounting the agitator on its actuating shaft.

With these and other objects in view, as will appear hereinafter, our invention consists in the parts, combinations and devices described herein, and more particularly defined in the appended claims.

Referring to the drawings:

Fig. 1 is an elevation of our improved machine, partly in section;

Fig. 2 is a plan of the agitator;

Fig. 3 is a horizontal sectional view taken on the line III-III of Fig. 1;

Fig. 4 is an elevation of the parts shown in Fig. 3;

Fig. 5 is an enlarged sectional view of the chain tightening device shown in Figs. 3 and 4; and

Fig. 6 is a sectional view on line VI-VI of Fig. 2.

In the drawing 10 designates the frame for supporting our improved machine, which frame may be of any suitable design, as for example, that shown in the drawing (Fig. 1)wherein it is provided with three supporting legs 11. Upon this frame is mounted the tub 12,

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which may be of any desired shape and construction. As herein shown the tub is cylindrical in design. It is open at the top where it is preferably provided with a removable or hinged cover (not shown).

Located within the tub in such a position that it is adapted to underlie the clothes is the agitator 13, which is provided on its upper surface with agitating means such, for example, as the radially arranged vanes or ribs 14. In the particular construction shown these vanes or ribs are struck up from the sheet metal of which the agitator is made. They may, however, be of any other suitable construction, such for example as wooden ribs secured in any desired manner to a wooden or metal agitator.

The agitator 13 is of the rotary type, means (which we will described later) being provided for oscillating it through the vertical shaft 15. This shaft 15 projects through the bottom of the tub 12. Leakage is prevented by the provision of a stuffing box such as indicated at 16. We preferably mount the agitator on the shaft 15 in the following manner. We secure the agitator 13 in any suitable manner, as indicated at 17, to a spider 18 of any suitable rigid material, the agitator being preferably domed at the center, as indicated at 19, so as to overlie the spider. This spider 18 in turn is adapted for splined engagement with the shaft 15 as indicated at 20. By this construction we have provided means whereby the agitator is normally connected to oscillate with the shaft 15, but is adapted to be readily removed therefrom, for the purpose of cleaning the tub and the like, by merely lifting it off.

537007

Referring now particularly to Fig. 2, it will be noted that the vanes or ribs 14 are unsymmetrically arranged. The purpose of so arranging the vanes is that we have found that if the agitator surface is symmetrical there is a marked tendency for a single one of the many pieces of laundry in the tub to cling to the agitator, an action which interferes seriously with the efficiency of the machine in washing. This action is apparently due to the fact that the oscillation of the agitator sets up currents in the fluid contents of the tub which move centrifugally of the agitator. And if the agitator is symmetrical these currents act with substantially equal force throughout the periphery of the agitator and tend to stretch the most available piece of laundry over the surface of the agitator and keep it there.

We have discovered, however, that by arranging the agitator unsymmetrically the equality of the currents is disturbed and as a result the piece of cloth in contact with the agitator will not be retained there but will be moved off to one side by the unequal currents acting upon it.

Many different unsymmetrical designs of agitators will accomplish this result and therefore come within the scope of our invention. The particular unsymmetrical design illustrated in Fig. 2 is formed by spacing one consecutive pair of vanes, such for example as the vanes 14a, 14b, farther apart than other similar pairs. We have found that by using an agitator of this type no single piece of cloth remains in contact with the agitator for an undue length of time.

Coming now to the means for actuating the agitator, we provide the shaft 15 at a point below the

bottom of the tank 12 with a drum 21 (Figs. 1, 3 and 4). Mounted adjacent this drum is the connecting rod 22 which is adapted to be reciprocated by the crank 23. This crank 23 is controlled by the clutch 24 and when the clutch is engaged the crank 23 is rotated by the vertical shaft 25, which in turn is operated by the motor 26, or any other suitable source of power.

The clutch 24 which we have provided is novel, so far as we are aware. It comprises the collar 24^a which is pinned or secured in any other desired manner to the vertical shaft 25, and the collar 24^b which is integral with the crank 23 loosely mounted on said shaft. The collars 24^a, 24^b, have coacting clutch teeth which, when the crank is elevated as shown in Fig. 1, engage to drive the crank. When, however, the crank is depressed the teeth are disengaged and the crank remains idle. Any suitable and convenient means, such as the hand lever 24^c with its connections may be employed for elevating and depressing the crank 23 to engage and disengage the clutch.

The advantage of the clutch which we have described above resides primarily in its ease and economy of manufacture. It requires no keys, keyways or splines. All that is necessary, so far as the shaft 25 is concerned, is the securing of the collar 24 thereto, as by means of the pin illustrated.

The means for operatively connecting the connecting rod 22 to the drum 21, as herein shown, comprise two flexible members 27, 28. The member 27 may be in the form of a single chain 27, one end of which is secured to the drum at 29 and the other end of which is secured to the connecting rod 22 at a point 30 which is toward the crank end of the latter. The other flexible member

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28 may be in the form of a double chain, one end of which is secured to the drum at the point 32 and the other end of which is secured to the connecting rod 22 at the point 33 which is at or toward the free end of the connecting rod. As will appear from the drawing, the flexible members 27 and 28 are so arranged that they are adapted to wind up on the drum 21 in opposite directions.

By virtue of the construction just described the drum 21 and through it the agitator 13 are oscillated in a regular and quiet manner.

In the course of continued oscillation of a part such as the agitator 13, considerable strain is placed upon the driving means, due largely to the rather sudden reversals in the direction of movement of the parts. As a result, if no provision were made to guard against it, the flexible members might become loose. The result would be an inefficient and noisy drive. Accordingly, we have provided means for automatically taking up any slack that may occur in the flexible members.

This automatic take-up means, as herein shown, comprises a bolt 33, one end 34 of which is adapted to engage the flexible member 27 and the other end 35 of which passes through the eye 30 secured to the connecting rod 22. The end 35 is screw threaded and provided with a nut 36 which, in cooperation with the eye 30, secures the flexible member 27 to the connecting rod. For keeping this nut 36 tight we provide a spring such as 37, (Figs. 3, 4 and 5), one end of which is secured to the connecting rod 22 at 38 and the other end of which engages a notch in the nut 36. During the reciprocation of the connecting rod 22 there are intervals of time, such as those occurring upon the reversal of movement, during which the flexible members are not subjected to tens[illegible]

by the normal operation of the machine. At such times, if there is any slack in the flexible members, the spring 37 will rotate the nut 36 and take it up. Thus the arrangement described serves to maintain the flexible members 27, 28, taut at all times.

The washing machine herein shown has been found in practice to be very efficient as a clothes washing mechanism and very convenient to operate and keep clean. The agitator being at the bottom and there being no obstruction in the tub above the agitator, it is a very simple matter to place clothes in the tub and to remove them therefrom. We are aware that agitators or dollys have heretofore been placed adjacent the bottom of the stationary tub of a washing machine. But so far as we are aware we are the first so to arrange the operating mechanism of an agitator which is located adjacent the bottom of the tub that there is no obstruction above the agitator. Also, the agitator as a whole may be readily removed from the tub when desired, for the purpose of cleaning.

The actuating mechanism which we have provided for oscillating the agitator are particularly efficient and noiseless in operation, due in part to the automatic take-up means which we have provided.

The terms and expressions which we have employed are used as terms of description and not of limitation, and we have no intention, in the use of such terms and expressions, of excluding any mechanical equivalent of the features shown and described, or portions thereof, but recognize that various modifications are possible within the scope of the invention claimed.

What we claim is:

1. In a washing machine, a container, an agitator located therein, and means for actuating said agitator, said agitator including a plurality of vanes of which those located at one portion of the agitator are spaced differently than the remainder.

2. In a washing machine, a container, an agitator located therein, and means for actuating said agitator, said agitator including a plurality of vanes between one consecutive pair of which there is a greater distance than there is between certain other consecutive pairs.

3. In a washing machine, a container, an agitator located therein, and means for actuating said agitator, said agitator including a plurality of vanes between one consecutive pair of which there is a greater space than there is between any other consecutive pair.

4. In a washing machine, a container, a rotary agitator located therein, and means for actuating said agitator, said agitator including a plurality of radially disposed vanes of which those located at one portion of the agitator are spaced differently than the r mainder.

5. In a washing machine, a container, a rotary agitator located therein, and means for actuating said agitator, said agitator including a plurality of radially disposed vanes between one consecutive pair of which there is a greater distance than there is between certain other consecutive pairs.

6. In a washing machine, a container, a rotary agitator located therein, and means for actuating said agitator, said agitator including a plurality of radially disposed vanes between one consecutive pair of

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which there is a greater distance than there is between any other consecutive pair.

7. In a washing machine, a container, an agitator located adjacent the bottom thereof, and means for oscillating said agitator, said agitator being provided on its upper surface with a plurality of radially disposed vanes of which those located at one portion of the agitator are spaced differently than the remainder.

8. In a washing machine, a container, an agitator located adjacent the bottom thereof, and means for oscillating said agitator, said agitator being provided on its upper surface with a plurality of radially disposed vanes between one consecutive pair of which there is a greater distance than there is between certain other consecutive pairs.

9. In a washing machine, a container, an agitator located adjacent the bottom thereof, and means for oscillating said agitator, said agitator being provided on its upper surface with a plurality of radially disposed vanes between one consecutive pair of which there is a greater distance than there is between any other consecutive pair.

10. In a washing machine, a container, an agitator located adjacent the bottom thereof, and means for oscillating said agitator, said means being located below said agitator and so arranged that the container is unobstructed above said agitator.

11. In a washing machine, a container, an agitator located adjacent the bottom thereof, and means for oscillating said agitator, said means including a power oscillated vertical shaft which passes through the bottom of the container and to which said agitator is

adapted to be detachably secured, said means being so arranged that the container is unobstructed above said agitator.

12. In a washing machine, a container, an agitator located therein, and means for actuating said agitator, said means including a power driven shaft, a clutch collar secured thereto, a crank loosely mounted upon said shaft and provided with a clutch collar adapted to engage with the first-named clutch collar, means for elevating and lowering said crank for engaging and disengaging said clutch collars, and means operatively connected to said crank for actuating said agitator.

13. In a washing machine, a container, an agitator located therein, and means for oscillating said agitator, said means comprising a drum operatively connected to said agitator, an arm, a pair of flexible members adapted to wind around said drum in opposite directions, each of said members having one end secured to said drum, and the other end secured to said arm, and means for reciprocating said arm.

14. In a washing machine, a container, an agitator located therein, and means for oscillating said agitator, said means comprising a drum operatively connected to said agitator, an arm, a pair of flexible members adapted to wind around said drum in opposite directions, each of said members having one end secured to said drum and the other end secured to said arm, means for reciprocating said arm, and means adapted automatically to tighten said flexible members as said arm reciprocates.

15. In a washing machine, a container, an agitator located therein, and means for oscillating said agitator, said means comprising a drum operatively con-

nected to said agitator, an arm, a pair of flexible members adapted to wind around said drum in opposite directions, each of said members having one end secured to said drum and the other end secured to said arm, means for reciprocating said arm, and means adapted automatically to tighten said flexible members as said arm reciprocates, said last named means including a bolt and nut, and spring means tending constantly to effect relative movement between said bolt and nut.

16. In a washing machine, a container, an agitator located therein, and means for actuating said agitator, said actuating means including an oscillatory shaft projecting through the bottom of said container, and means secured to said agitator and adapted to take over said shaft in splined engagement therewith whereby said agitator may be detachably connected to said shaft.

17. In a washing machine, a container, an agitator located therein, and means for actuating said agitator, said actuating means including an oscillatory shaft projecting through the bottom of said container, a spider provided with horizontal extensions secured to the under surface of said agitator and with a vertical extension adapted to take over said shaft in splined engagement therewith, whereby said agitator may be detachably connected to said shaft.

18. In a washing machine, a container, an agitator located therein, and means for actuating said agitator, said actuating means including an oscillatory shaft projecting through the bottom of said container, a spider provided with horizontal extensions secured to the under surface of said agitator and with a vertical extension adapted to take over said shaft in splined

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engagement therewith, whereby said agitator may be detachably connected to said shaft, said actuator being distorted adjacent said vertical extension so as to overlie the same.

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Herman W Doughty

George L Davis

OATH

State of New York :
: ss.:
County of Broome :

HERMAN W. DOUGHTY and GEORGE L. DAVIS, the above named petitioners, being duly sworn, depose and say: That they are citizens of the United States and residents of Binghamton, Broome County, New York, and they verily believe themselves to be the original, first and joint inventors in new and useful improvements in WASHING MACHINES, described and claimed in the annexed specification; that they do not know and do not believe that the same was ever known or used before their invention or discovery thereof, or patented or described in any printed publication in any country before their invention or discovery thereof, or more than two years prior to this application, or in public use or on sale in the United States for more than two years prior to this application; that said invention has not been patented in any country foreign to the United States on an application filed by them or their legal representatives or assigns more than twelve months prior to this application, and that no application for patent on said invention has been filed by them or their legal representatives or assigns in any country foreign to the United States.

Herman W Doughty

George L Davis

Sworn to and subscribed before me this 23 day of March, 1922

Geo L Hole

Notary Public

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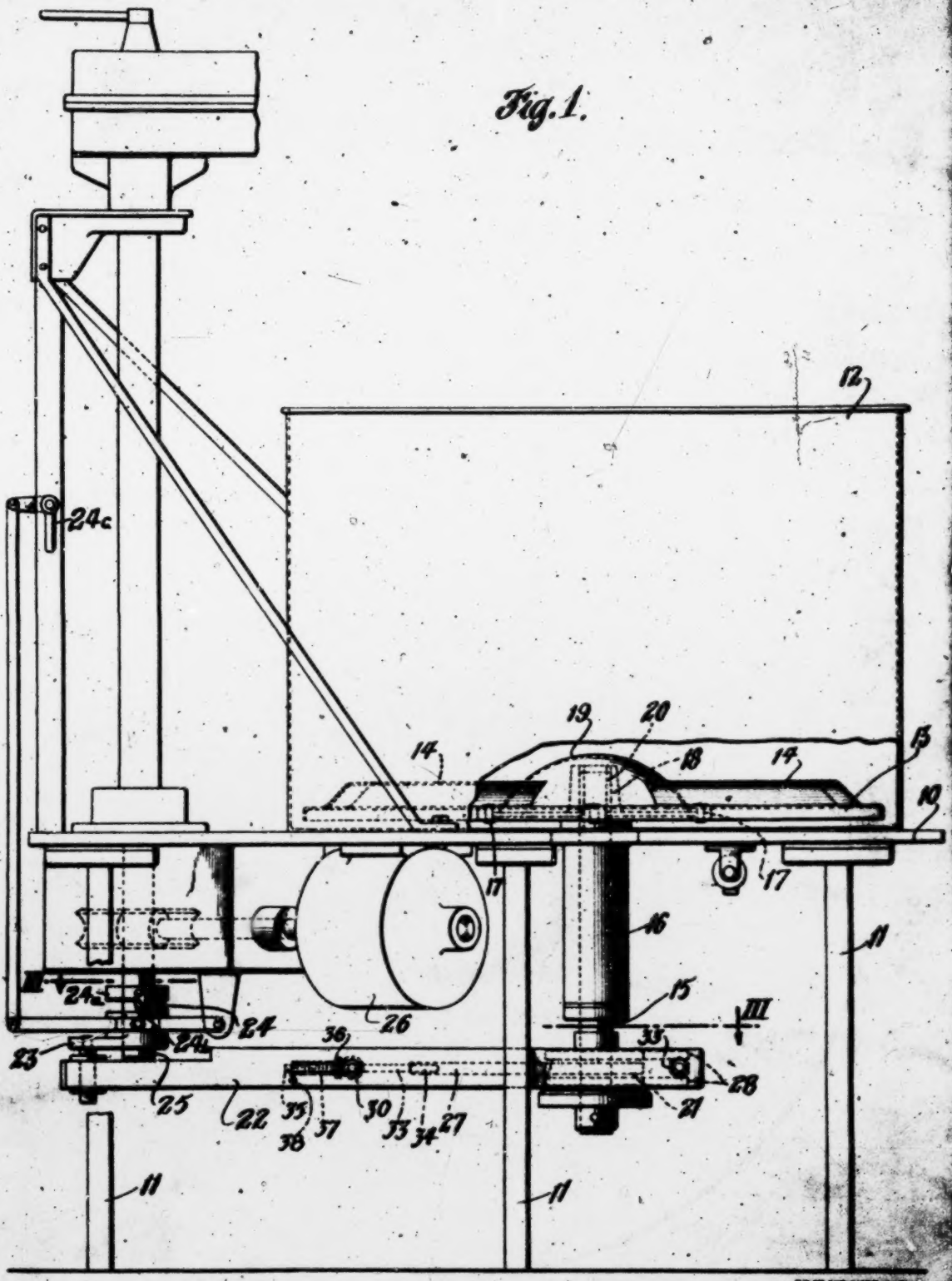
Fig. 1.



INVENTORS
Herman H. Dant
George L. Dant
BY
Merrell & Kelly
ATTYS

Fig. 3.

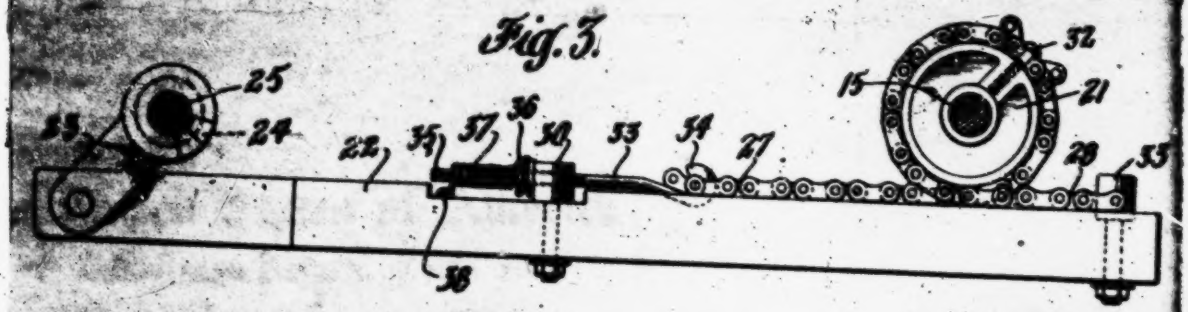


Fig. 4.

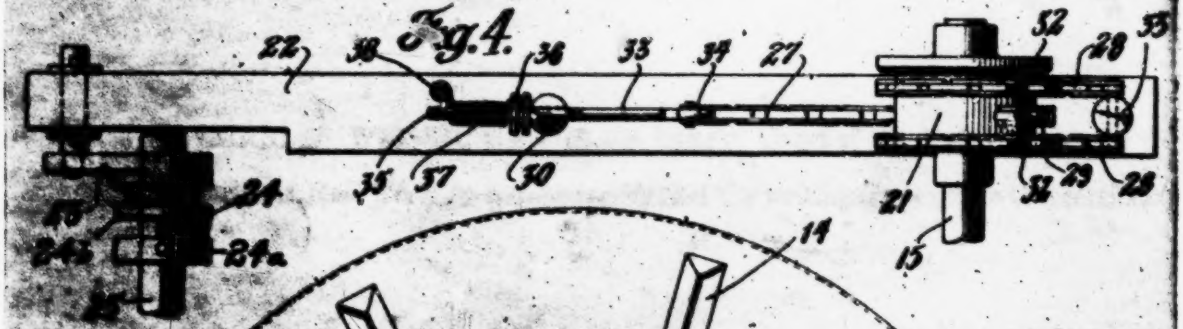


Fig. 2.

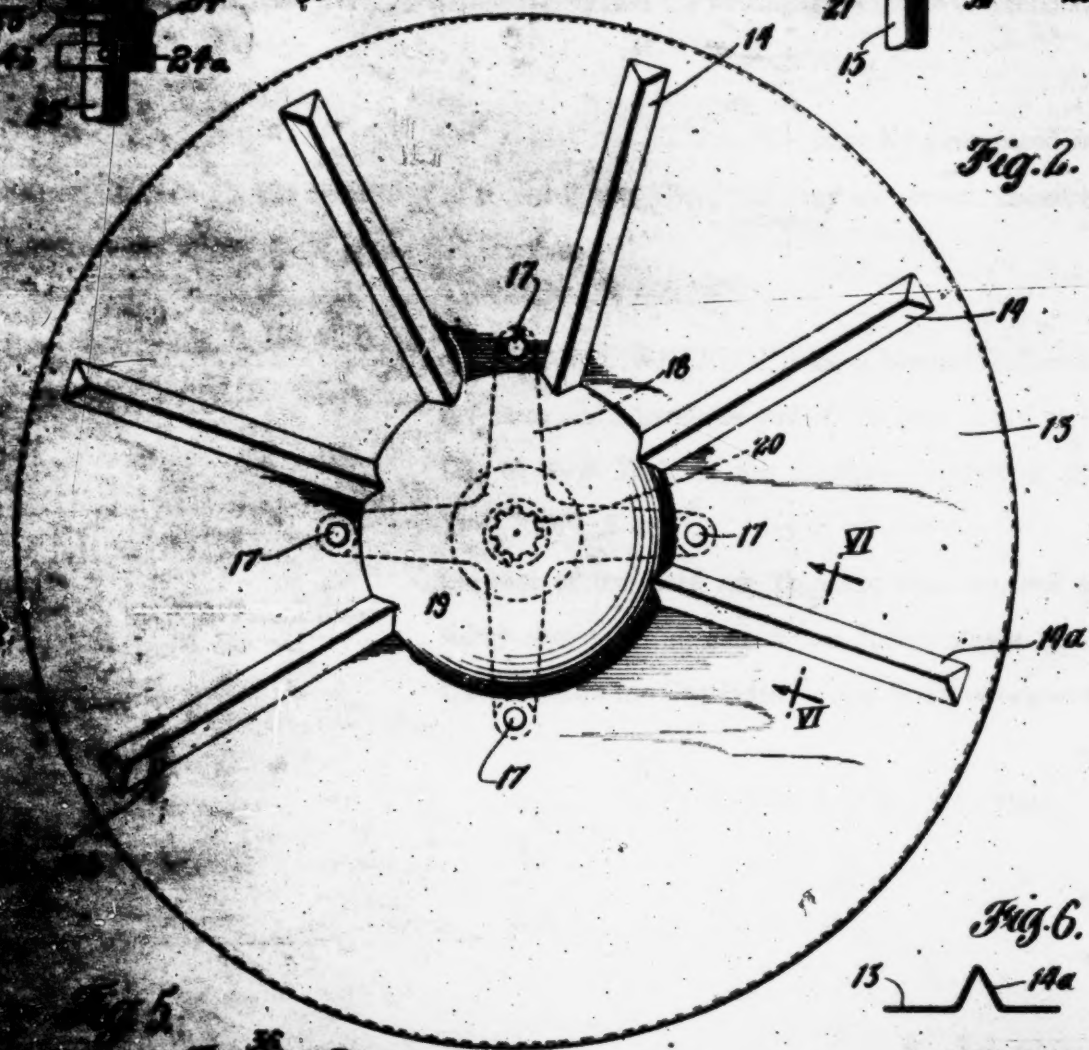
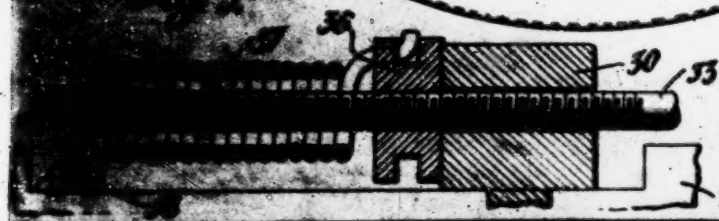


Fig. 6.

Fig. 5.



INVENTORS
Herman N. Daugherty
George L. Davis
BY
Merrell C. Clark
ATTORNEY

DEFENDANT'S EXHIBIT 32.

Form No. 110-A

United States of America } ss:
SOUTHERN DISTRICT OF NEW YORK

I, CHARLES WEISER, Clerk of the District Court of the United States for the Southern District of New York, do hereby certify that the writings annexed to this certificate have been compared with their originals on file and remaining of record in this office; that they are correct transcripts therefrom and of the whole of the said originals.

S. D. C. W. D. Mo. W. D.
THE MAYTAG COMPANY
vs.
GENERAL ELECTRIC SUPPLY CORPORATION
IN EQUITY 2032
DEFENDANTS EXHIBIT 32

IN TESTIMONY WHEREOF I have hereunto subscribed my name and affixed the seal of the said Court at the City of New York, in the Southern District of New York, this 20th day of November in the year of our Lord one thousand nine hundred and thirty-seven and of the Independence of the United States the One Hundred and Sixty-second

Charles Weiser Clerk.

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WEP ATL. GA. 1-5-37 2500

UNITED STATES DISTRICT COURT

SOUTHERN DISTRICT OF NEW YORK

THE MAYTAG COMPANY, a corporation, Plaintiff,	
vs.	In Equity No. 75-202
EASY WASHING MACHINE CORPORATION, Defendant.	
THE MAYTAG COMPANY, a corporation, Plaintiff,	
vs.	In Equity No. 81-257
HURLEY MACHINE CO. and ELECTRIC HOUSEHOLD UTILITIES CORPORATION, Defendants.	

The issues in the above suits having duly come on to be heard by this Court at a Stated Term, the following Findings of Fact and Conclusions of Law are filed pursuant to Equity Rule No. 70-1/2.

FINDINGS OF FACT

1. Plaintiff, The Maytag Company, is the sole owner of the Snyder Letters Patent in suit No. 1,866,779, issued to it July 12, 1932, Claims 23, 26 and 29 of which are here asserted. Plaintiff's Exhibits 9, 10 and 11 are specimens of the machines made by the plaintiff which embody the structures shown in said patent.

2. Defendant, The Easy Company, is a corporation organized and existing under the laws of the State of Delaware and has an office and a regular and established place of business in the City of New York, State of New York within the Southern District of New York, where it committed the acts complained of in this suit.

3. The defendants, Hurley Machine Company and Electric Household Utilities Corporation are corporations existing under and by virtue of the laws of the State of Illinois, and each has a regular and established place of business in the City of New York, State of New York, in the Southern District of New York, where said corporations committed the acts complained of.

4. That the defendant, The Easy Company, subsequent to notice of alleged infringement of the Snyder patent in suit and before the filing of this suit, made and sold washing machines of which Plaintiff's Exhibit 3 is a specimen.

5. That after notice of alleged infringement of the Snyder patent and before the filing of this suit, defendants, The Hurley Company and Electric Household Utilities Corporation sold from their regular established place of business in New York washing machines of which Plaintiff's Exhibit 4 is a specimen.

6. That by its opinion, rendered November 30, 1936, the Circuit Court of Appeals of the Second Circuit, in the suit of Plaintiff against The Brooklyn Edison Company held the said Snyder patent in suit ~~in-~~ claims 23, 26 and 38 of ~~valid for anticipation by certain prior patents and machines named in said opinion.~~ anticipated by the prior art and invalid.

A.C.

7. That the evidence offered by Plaintiff herein in support of its contention that a patentable invention is described and claimed in the Snyder patent in suit does not differ in substance from that which was submitted to the Court of Appeals in the said suit against The Brooklyn Edison Company.

8. That the Snyder patent in suit is anticipated by the Davis patent No. 1,240,826, the Doughty & Davis patent No. 1,496,305, commercial machines made under said patents by the Nineteen Hundred Company of Binghamton, New York, known respectively as Form 1, Form 2, Form 3 and Form 4 machines, and the Jardine British patent No. 18,202 of 1891.

CONCLUSIONS OF LAW

1. Letters Patent No. 1,866,779 in suit are invalid as to Claims 23, 26 and 29 thereof.

2. The Bills of Complaint are dismissed with costs to the respective defendants.

Alfred C. Coxe
United States District Judge

New York, N.Y.
Dated June 8, 1927

E75-202

UNITED STATES DISTRICT COURT
SOUTHERN DISTRICT OF NEW YORK

- - - - - - - - - - - - - - - - - -

In Equity No. 75-202

THE MAYTAG COMPANY,
a corporation,
Plaintiff,

vs.

EASY WASHING MACHINE CORP.,
Defendant.

- - - - - - - - - - - - - - - - - -

In Equity No. 81-257

THE MAYTAG COMPANY,
a corporation,
Plaintiff,

vs.

HURLEY MACHINE CO. and
ELECTRIC HOUSEHOLD UTILITIES
CORPORATION,
Defendants.

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DEFENDANTS' PROPOSED FINDINGS OF FACT AND CONCLUSIONS OF LAW

JUN 9 1937

PENNIE, DAVIS, MARVIN AND EDMONDS
165 BROADWAY
NEW YORK

DEFENDANT'S EXHIBIT 33.

Form No. 110-A

United States of America } ss:
SOUTHERN DISTRICT OF NEW YORK

I, CHARLES WEISER, Clerk of the District Court of the United States for the Southern District of New York, do hereby certify that the writings annexed to this certificate have been compared with their originals on file and remaining of record in this office; that they are correct transcripts therefrom and of the whole of the said originals.

IN TESTIMONY WHEREOF I have hereunto subscribed my name and affixed the seal of the said Court at the City of New York, in the Southern District of New York, this 20th day of November in the year of our Lord one thousand nine hundred and thirty-seven and of the Independence of the United States the One Hundred and Sixty-second

Charles Weiser Clerk.

U. S. D. C. W. D. Mo. W. D.

THE MAYTAG COMPANY

vs.

GENERAL ELECTRIC SUPPLY CORPORATION

IN EQUITY 2032

DEFENDANTS EXHIBIT 33.

USP ATL. GA. 1-4-37 2910

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UNITED STATES DISTRICT COURT
SOUTHERN DISTRICT OF NEW YORK

- X

THE MAYTAG COMPANY, :

Plaintiff, :

vs. : Equity No. 75-208

EASY WASHING MACHINE CORPORATION, :

Defendant. :

- X

NOTICE

PLEASE TAKE NOTICE that on the 24th day of May, 1937, at 10:30 o'clock in the forenoon, at the office of the Clerk of the United States District Court for the Southern District of New York, United States Court House, Foley Square, Borough of Manhatten, City and State of New York, we shall present to the Clerk for signature by the Court a Final Decree, a copy of which Decree is hereto attached.

Dated: New York, N. Y.
May 21st, 1937.

Pennie Davis Marvin & Edmonds
Solicitors for Defendant

To: John F. Ryan,
51 East 42nd Street,
New York, N. Y.,
Solicitor for Plaintiff.

Let this be Standing Order
to be submitted / cored the
proposed decree

May 2nd (37)

At a stated term of the District Court of the United States in and for the Southern District of New York held at the United States Court House, Foley Square, in the Borough of Manhattan, City and State of New York on the 28th day of May, 1937.

Honorable Alfred C. Coxe,

United States District Judge

- - - - - - - - - - - - - - - - - - - -x

THE MAYTAG COMPANY, :

Plaintiff, :

vs. : Equity No. 75-202

EASY WASHING MACHINE CORPORATION, :

Defendant. :

- - - - - - - - - - - - - - - - - - - -x

FINAL DECREE

This cause came on to be heard at this term and was argued by counsel and thereupon upon consideration thereof it was,

ORDERED, ADJUDGED AND DECREED as follows: viz.

1. That claims Nos. 23, 26 and 29 of United States Letters Patent 1,866,779, issued July 12, 1932 to The Maytag Company as assignee, of Howard F. Snyder, are invalid.

2. That the Bill of Complaint herein be, and the same is, hereby dismissed.

3. That the Defendant recover of the Plaintiff its costs in this Court to be duly taxed and that the Defendant have execution therefor.

Alfred C. Coxe

United States District Judge.

UNITED STATES DISTRICT COURT

SOUTHERN DISTRICT OF NEW YORK

- - - - - - - - - - - - - - - - - -

THE MAYTAG COMPANY,

Plaintiff,

vs.

EASY WASHING MACHINE CORPORATION,

Defendant.

- - - - - - - - - - - - - - - - - -

Equity No. 75,202

- - - - - - - - - - - - - - - - - -

NOTICE

and

FINAL DECREE

Receipt of a copy of the within

acknowledged this 21 day of May 193 7

John F. Ryder

Solicitors for Plaintiff

DISTRICT COURT
FILED
JUN 9 1937
S.D. of N.Y.

PENNIE, DAVIS, MARVIN AND EDMONDS
165 BROADWAY
NEW YORK

1185

DEFENDANT'S EXHIBIT 34.

Form No. 110-A

United States of America } ss:
SOUTHERN DISTRICT OF NEW YORK

I, CHARLES WEISER, Clerk of the District Court of the United States for the Southern District of New York, do hereby certify that the writings annexed to this certificate

have been compared with their originals on file and remaining of record in this office; that they are correct transcripts therefrom and of the whole of the said originals.

IN TESTIMONY WHEREOF I have hereunto subscribed my name and affixed the seal of the said Court at the City of New York, in the Southern District of New York, this 20th day of November in the year of our Lord one thousand nine hundred and thirty-seven and of the Independence of the United States the One Hundred and Sixty-second

Charles Weiser Clerk.

U. S. D. C. W. D. Mo. W. D.

THE [illegible]G COMPANY

vs.

GENERAL [illegible]TY CORPORATION

[illegible]Y 2032

DEFENDANT'S EXHIBIT 34

USP ATL. SA. 1-4-37 2000

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Judge Cole 11174.1 Cope, J

11,174 63719T

UNITED STATES DISTRICT COURT

SOUTHERN DISTRICT OF NEW YORK

- - - - - - - - - - - - - - - - - - -x

THE MAYTAG COMPANY, :

Plaintiff, :

vs. : Equity No. 81,257

HURLEY MACHINE COMPANY and ELECTRIC HOUSEHOLD UTILITIES CORPORATION :

Defendants. :

- - - - - - - - - - - - - - - - - - -x

NOTICE

PLEASE TAKE NOTICE that on the 24th day of May, 1937, at 10:30 o'clock in the forenoon, at the office of the Clerk of the United States District Court for the Southern District of New York, United States Court House, Foley Square, Borough of Manhatten, City and State of New York, we shall present to the Clerk for signature by the Court a Final Decree, a copy of which Decree is hereto attached.

Dated: New York, N. Y.
May 21st, 1937.

Pennie Davis Marvin & Edmonds
Solicitors for Defendants.

To: John F. Ryan,
51 East 42nd Street,
New York, N. Y.,
Solicitor for Plaintiff.

At a stated term of the District Court of the United States in and for the Southern District of New York held at the United States Court House, Foley Square, in the Borough of Manhattan, City and State of New York on the 2nd day of June 1937.

Honorable Alfred C. Coxe,

United States District Judge.

- -x

THE MAYTAG COMPANY, :

Plaintiff, :

vs. : Equity No. 81-257

HURLEY MACHINE COMPANY and ELECTRIC HOUSEHOLD UTILITIES CORPORATION, :

Defendants. :

- -x

FINAL DECREE

This cause came on to be heard at this term and was argued by counsel and thereupon upon consideration thereof it was,

ORDERED, ADJUDGED AND DECREED as follows: viz.

1. That claims Nos. 23, 26 and 29 of United States Letters Patent 1,866,779, issued July 12, 1932 to the Maytag Company as assignee, of Howard F. Snyder, are invalid.

2. That the Bill of Complaint herein be, and the same is, hereby dismissed.

3. That the Defendants recover of the Plaintiff its costs in this Court to be duly taxed, and that the Defendants have execution therefor.

Alfred C. Coxe

United States District Court.

UNITED STATES DISTRICT COURT

SOUTHERN DISTRICT OF NEW YORK

- - - - - - - - - - - - - - - - - -

THE MAYTAG COMPANY,

Plaintiff,

vs.

HURLEY MACHINE COMPANY and ELECTRIC HOUSEHOLD UTILITIES CORPORATION

Defendants

- - - - - - - - - - - - - - - - - -

Equity No. 81,257

- - - - - - - - - - - - - - - - - -

NOTICE

and

FINAL DECREE

Receipt of a copy of the within

acknowledged this 21 day May 1937

John F. Ryan

Solicitors for Plaintiff

PENNIE, DAVIS, MARVIN AND EDMONDS

165 BROADWAY

NEW YORK